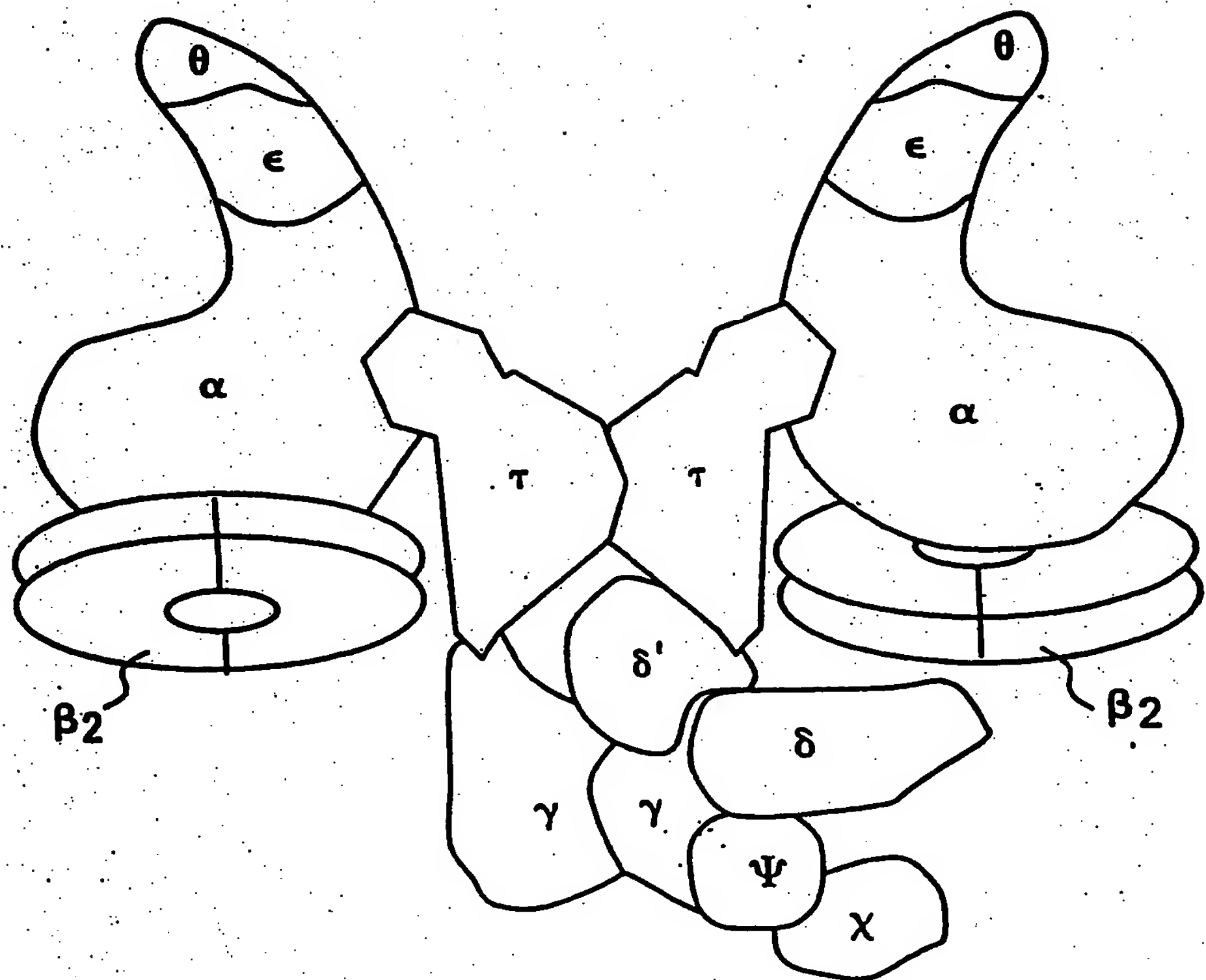


FIG.1



# ATP binding

E. coli  
 MSYQVLARKWRPQTFADVVGQEHVLTALANGLSLGRIHHAYLFSGTRGVGKTSIARLLAK  
 B. subtilis  
 MSYQALYRVFRPQRFEDVVGQEHITKTLQNALLQKFSHAYLFSGPRGTGKTSAAKIFAK  
 \*\*\* \*

E. coli  
 GLNCETGITATPCGVCDNCREIEQGRFVDLIEIDAASRTKVEDTRDLLDNVQYAPARGRF  
 B. subtilis  
 AVNCEHAPVDEPCNECAACKGITNGSISDVIEIDAASNNGVDEIRDVKVKFAPSAVTY  
 \*\*\* \*

E. coli  
 KVYLIDEVHMLSRHSFNALLKTLLEPPPEHVKFLLATDPQKLPVTILSRCLQFHLKALDV  
 B. subtilis  
 KVYIIDEVHMLSIGAFNALLKTLLEPPPEHCIFILATTEPHKIPLTIIISRCQRFDFKRITS  
 \*\*\* \*

FIG. 2

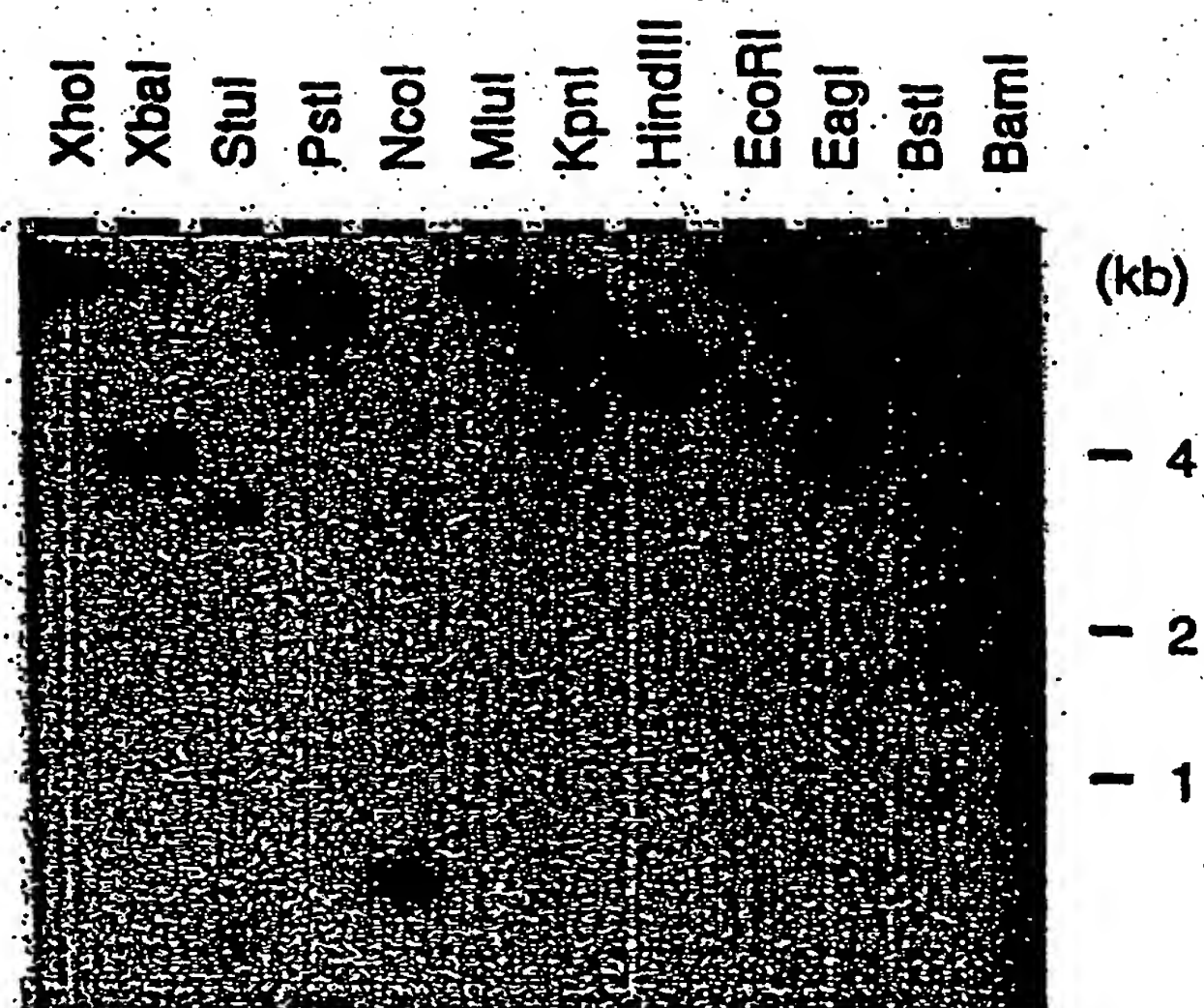


FIG.3

TCCGGGGTG	GGGTTCCAG	GTAGACCCCG	GCCCCTC <sup>c</sup> CG	TGAGCCCCCTT	TACCAGGCC	60
GCACCTCCT	CCAGGGGGC	CAAGCGTGC	AAGGAGAGGA	ACGTCCGCAC	CACGCCCTAT	120
S.D.						
ACTAGCCTT	GTG AGC GCC CTC TAC CGC CGC TTC CGC CCC CTC ACC TTC CAG GAG GTG GTG					180
	met ser ala leu tyr arg arg phe arg pro leu thr phe gln glu val val					(17)
GGG CAG GAG CAC GTG AAG GAG CCC CTC CTC AAG GCC ATC CGG GAG GGG AGG CTC GCC CAG						240
gly gln glu his val lys glu pro leu leu lys ala ile arg glu gly arg leu ala gln						(37)
GCS TAC CTS TTC TCC GGS AC						
GCC TAC CTC TTC TCC GGG CCC AGG GGC GTG GGC AAG ACC ACC GCG AGG CTC CTC GCC						300
ala tyr leu phe ser gly pro arg gly val gly lys thr thr ala arg leu leu ala						(57)
ATG GCG GTG GGG TGC CAG GGG GAA GAC CCC CCT TGC GGG GTC TGC CCC CAC TGC CAG GCG						360
met ala val gly cys gln gly glu asp pro pro cys gly val cys pro his cys gln ala						(77)
GtG CAG AGG GGC GCC CAC CCG GAC GTG GTG GAC ATT GAC GCC GCC AGC AAC AAC TCC GTG						420
val gln arg gly ala his pro asp val val asp ile asp ala ala ser asn ser val						(97)
GAG GAC GTG CGG GAG CTG AGG GAA AGG ATC CAC CTC GCC CTC TCT GCC CCC AGG AAG						480
glu asp val arg glu leu arg glu arg ile his leu ala pro leu ser ala pro arg lys						(117)
C						
GTC TTC ATC CTG GAC GAG GCC CAC ATG CTC TCC AAA AGC GCC TTC AAC GCC CTC CTC AAG						540
val phe ile leu asp Glu ala his met leu ser lys ser ala phe asn ala leu leu lys						(137)

**FIG. 4A-1**





GAG CGC CTC GCC CGC CGC TCC GAC GCC TTA AGC CTG GAG GTG GCC CTC CTG GAG GCG GGA 1140  
glu arg leu ala arg arg ser ala leu ser leu glu val ala leu leu glu ala gly (337)

AGG GCC CTG GCC GAG GCC CTA CCC CAG CCC ACG GGC GCT CCT TCC CCA GAG GTC GGC 1200  
arg ala leu ala ala glu ala leu pro gln pro thr gly ala pro ser pro glu val gly (357)

CCC AAG CCG GAA AGC CCC CCG ACC CCG GAA CCC CCA AGG CCC GAG GAG GCG CCC GAC CTG 1260  
pro lys pro glu ser pro pro thr pro glu pro pro arg pro glu ala pro asp leu (377)

CGG GAG CGG TGG CGG GCC TTC CTC GAG GCC CTC AGG CCC ACC CTA CGG GCC TTC GTG CGG 1320  
arg glu arg trp arg ala phe leu glu ala leu arg pro thr leu arg ala phe val arg (397)

GAG GCC CGC CGC GAG GTC CGG GAA GGC CAG CTC TGC CTC GCT TTC CCC GAG GAC AAG GCC 1380  
glu ala arg pro glu val arg glu gly gln leu cys leu ala phe pro glu asp lys ala (417)

TTC CAC TAC CGC AAG GCC TCG GAA CAG AAG GTG AGG CTC CTC CCC CTG GCC CAG GCC CAT 1440  
phe his tyr arg lys ala ser glu gln lys val arg leu leu pro leu ala gln ala his (437)

frameshift site

TTC GGG GTG GAG GAG GTC GTC CTC GAG GGA GAA AAA AAA AGC CTG AGC CCA AGG 1500  
phe gly val glu glu val val leu val leu glu gly lys lys ser leu ser pro arg (457)

FIG.4B-1

CCC CGC CCG GCC CCA CCT CCT GAA GCG CCC GCA CCC CCG GGC CCT CCC GAG GAG GAG GTA	1560
pro arg pro ala pro pro pro pro ala pro ala pro pro gly pro pro glu glu val	(477)
GAG GCG GAG GAA GCG GCG GAG GAG GCC CCG GAG GAG GCC TTG AGG CCG GTG GTC CGC CTC	1620
glu ala glu glu ala ala glu glu ala pro glu ala leu arg arg val arg leu	(497)
CTG GGG GGG CCG GTG CTC TGG GTG CCG CCG CCG ACC AGG ACC CCG GAG GCG CCG GAG GAG GAA	1680
leu gly gly arg val leu trp val arg arg pro arg thr arg glu ala pro glu glu glu	(517)
CCC CTG AGC CAA GAC GAG ATA GGG GGT ACT GGT ATA TAA	1740
pro leu ser gln asp glu ile gly thr gly ile *	(529)
CGACCTCGGA CAAGAGACCG TGGACAACAT CCTCAAGCGC CTCCGCCGTA TTGAGGGCCA	1820
GGTGCGGGGG CTCCAGAAGA TGGTGGCCGA GGGCCGCCCC TGCAGCAGG TCCTCACCCA	1880
GATGACCGCC ACCAAGAAGG CCATGGAGGC GCGGCCACC CTGATCCTCC ACGAGTTCTT	1940
GAACGTCTGC GCCGCCGAGG TCTCCGAGGG CAAGGTGAAC CCAAGAAGC CCGAGGAGAT	2000
CGCCACCATG CTGAAGAACT TCATCTA	2027

FIG.4B-2

GGG	CAG	GAG	CAC	GTG	AGC	GCC	CTC	TAC	CGC	CGC	TTC	CTC	CGC	CCC	ATC	CGG	GAG	ACC	TTC	CAG	TTC	ACC	TTC	CAG	GAG	GTG	GTG	51
GCC	TAC	CTC	TTC	TCC	TGG	GGG	CCC	AGG	GGC	CTC	AAG	CTC	CTC	CCC	ATC	CGG	AGG	GAG	GAG	AGG	GGG	GAG	CTC	CTC	CTC	CTC	CAG	111
ATG	GCG	GTG	GGG	TGC	TGG	CAG	GGG	GAA	GAC	CCC	CCT	GGG	GGG	TGC	GGG	CTC	TGC	CTC	CCC	CTC	TGC	CTC	CTC	CTC	TGC	CAG	GCG	171
GtG	CAG	AGG	GGC	GCC	GCC	CAC	CCG	GAC	GTG	GTG	GAC	ATT	GAC	ATT	GAC	GGC	GCC	GCC	GGC	AGC	AAC	AAC	TCC	GTG	TCC	GTG	GTG	231
GAG	GAC	GTG	CGG	GAG	GAG	CTG	AGG	GAA	AGG	ATC	CAC	CTC	GGC	CTC	GGC	CTC	TCT	GGC	CCC	CCC	AGG	AAG	AGG	AGG	AGG	AGG	AGG	351
GTC	TTC	ATC	CTG	GAC	GAC	GAG	GCC	CAC	ATG	CTC	TCC	AAA	AGC	GGC	GGC	TTC	AAC	GGC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	AAG	AAG	411
ACC	CTG	GAG	GAG	CCC	CCC	CCC	CCC	CAC	GTC	CTC	TTC	GGC	GGC	GGC	GGC	ACC	ACC	GGC	CCC	GGC	AGG	AGG	AGG	AGG	AGG	AGG	AGG	471
ATG	CCC	CCC	ACC	ATC	ATC	CTC	TCC	CGC	ACC	CAG	CAC	TTC	CGC	TTC	CGC	CGC	CGC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	531
GAG	ATC	GCC	TTT	AAG	CTC	CTC	CGG	CGC	ATC	CTG	GAG	GCC	GTG	GGG	CGG	CGG	GAG	CGG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	591
GCC	CTC	CTC	CTC	CTC	CTC	CTC	CGC	CTG	GCG	GAC	GGG	GCC	CTT	AGG	GAC	GCG	GAA	AGC	AGC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	CTC	651
GAG	CGC	TTC	CTC	CTC	CTC	CTG	GAA	GGC	CCC	CTC	ACC	CGG	AAG	GAG	GTG	GAG	CGC	CGC	GCC	GCC	GCC	GCC	GCC	GCC	GCC	GCC	GCC	711
TCC	CCC	CCA	GGG	ACC	GGG	GGG	GTG	GCC	GAG	ATC	GCC	TCC	CTC	CTC	GGG	AGG	GGG	AAA	ACG	ACG	ACG	ACG	ACG	ACG	ACG	ACG	ACG	771
GAG	GCC	CTG	GGC	CTC	CTC	GCC	CGG	CGC	CTC	TAC	GGG	GAA	GGG	TAC	GCC	CCG	AGG	AGC	CTG	CTG	CTG	CTG	CTG	CTG	CTG	CTG	CTG	831
TCG	GGC	CTT	TTG	GAG	GAG	GTG	TTC	CGG	GAA	GGC	CTC	TAC	GCC	GCC	TTC	GGC	CTC	GCG	GGA	ACC	ACC	ACC	ACC	ACC	ACC	ACC	ACC	891
CCC	CTT	CCC	GCC	CCG	CCG	CCC	CAG	GCC	CTG	ATC	GCC	ATG	ACC	GCC	GCC	CTG	GAC	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	951
GAG	CGC	CTC	GCC	CGC	CGC	CGC	TCC	GAC	GCC	TTA	AGC	GAG	GTG	GCC	GCC	CTC	CTG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	1011
AGG	GCC	CTG	GCC	GCC	GCC	GAG	GCC	CTA	CCC	CAG	CCC	ACG	GGC	GCT	CCT	TCC	CCA	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	1071
CCC	AAG	CCG	GAA	AGC	AGC	CCC	CCG	ACC	CCG	GAA	CCC	CCA	AGG	CCC	GAG	GAG	GCG	CCC	CCC	GAC	GAC	GAC	GAC	GAC	GAC	GAC	GAC	1131
CGG	GAG	CGG	TGG	CGG	CGG	GCC	TTC	CTC	GAG	GCC	CTC	AGG	CCC	ACC	CTA	CGG	GCC	TTC	TTC	GTG	GTG	GTG	GTG	GTG	GTG	GTG	GTG	1191
GAG	GCC	CGC	CCG	GAG	GAG	GTG	CGG	GAA	GGC	CAG	CTC	TGC	CTC	GCT	TTC	CCC	GAG	GAC	AAG	AAG	AAG	AAG	AAG	AAG	AAG	AAG	AAG	1251
TTC	CAC	TAC	CGC	AAG	GCC	GCC	TCG	GAA	CAG	AAG	GTG	AGG	CTC	CTC	CCC	CTG	GCC	CAG	GCC	CAT	CAT	CAT	CAT	CAT	CAT	CAT	CAT	1311
TTC	GGG	GTG	GAG	GAG																								

**FIG. 4C**



Met	ser	ala	leu	tyr	arg	arg	pro	leu	thr	phe	gln	glu	val	gly	gln	glu	20
his	val	lys	glu	pro	leu	arg	ala	ile	arg	glu	gly	arg	leu	ala	tyr	leu	40
phe	ser	gly	pro	arg	gly	val	lys	thr	thr	ala	thr	ala	leu	ala	met	ala	60
gly	cys	gln	gly	glu	asp	pro	pro	gly	val	cys	pro	his	cys	gln	ala	val	80
gly	ala	his	pro	asp	val	val	asp	ile	ala	ser	asn	asn	ser	val	glu	asp	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	leu	ser	ala	pro	arg	lys	val	120
leu	asp	glu	ala	his	met	leu	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	140
glu	pro	pro	pro	his	val	leu	phe	val	ala	thr	thr	glu	pro	glu	arg	met	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	phe	arg	leu	thr	glu	glu	ile	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	gly	arg	glu	ala	glu	glu	ala	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	asp	ala	glu	ser	leu	leu	glu	phe	220
leu	leu	leu	glu	gly	pro	leu	ile	lys	glu	val	glu	arg	ala	leu	gly	ser	240
gly	thr	gly	val	ala	glu	ile	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	260
gly	leu	ala	arg	arg	leu	tyr	gly	glu	tyr	ala	pro	arg	ser	leu	val	ser	280
leu	glu	val	phe	arg	glu	gly	leu	tyr	ala	phe	gly	leu	ala	gly	thr	pro	300
ala	pro	pro	gln	ala	leu	ile	ala	met	thr	ala	leu	asp	glu	ala	met	glu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	glu	ala	gly	arg	340
ala	ala	glu	ala	leu	pro	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	360
glu	ser	pro	pro	thr	pro	glu	pro	arg	pro	glu	glu	ala	pro	asp	leu	arg	380
trp	arg	ala	phe	leu	glu	ala	pro	arg	thr	leu	arg	ala	phe	val	arg	glu	400
pro	glu	val	arg	glu	gly	gln	lys	leu	ala	phe	pro	glu	asp	lys	ala	phe	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	pro	leu	ala	gln	ala	his	gly	440
glu	glu	val	val	leu	val	leu	glu	gly	lys	lys	ser	leu	ser	pro	arg	pro	460
ala	pro	pro	pro	glu	ala	pro	ala	pro	gly	pro	pro	glu	glu	val	glu	ala	480
glu	ala	ala	glu	glu	ala	pro	glu	ala	leu	arg	arg	val	val	arg	leu	gly	500
arg	val	leu	trp	val	arg	arg	thr	arg	glu	ala	pro	glu	glu	glu	pro	leu	520
gln	asp	glu	ile	gly	thr	gly	ile										529

FIG.4D

Met	ser	ala	leu	tyr	arg	arg	pro	leu	thr	phe	gln	glu	val	gly	gln	glu	20	
his	val	lys	glu	pro	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	ala	tyr	leu	40
phe	ser	gly	pro	arg	gly	lys	thr	thr	thr	ala	arg	leu	leu	ala	met	ala	val	60
gly	cys	gln	gly	glu	asp	pro	pro	val	cys	pro	his	cys	gln	ala	val	gln	arg	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	asn	asn	ser	val	glu	asp	val	100
arg	glu	leu	arg	glu	arg	ile	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120
leu	asp	glu	ala	his	met	leu	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140
glu	pro	pro	pro	his	val	leu	phe	val	ala	thr	thr	glu	pro	glu	arg	met	pro	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	arg	leu	thr	glu	glu	glu	ile	ala	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	val	gly	arg	glu	ala	glu	ala	leu	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	ala	glu	ser	leu	leu	arg	phe	220
leu	leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	arg	ala	leu	gly	ser	pro	pro	240
gly	thr	gly	val	ala	glu	ile	glu	ala	ala	arg	gly	lys	thr	ala	glu	ala	leu	260
gly	leu	ala	arg	arg	leu	tyr	gly	glu	ala	pro	arg	ser	leu	val	ser	gly	leu	280
leu	glu	val	phe	arg	arg	glu	glu	glu	ala	phe	gly	leu	ala	gly	thr	pro	leu	300
ala	pro	pro	gln	ala	ala	ile	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	val	ala	leu	leu	glu	ala	gly	arg	ala	340
ala	ala	glu	ala	leu	thr	gln	pro	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	360
glu	ser	pro	pro	thr	pro	pro	glu	pro	arg	glu	ala	pro	asp	leu	arg	glu	arg	380
trp	arg	ala	phe	leu	glu	ala	leu	arg	pro	thr	leu	arg	phe	val	arg	glu	ala	400
pro	glu	val	arg	glu	gly	gln	gly	lys	ala	phe	pro	glu	asp	lys	ala	phe	his	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	pro	leu	ala	gln	ala	his	phe	gly	440
glu	glu	val	val	leu	val	leu	glu	gly	lys	lys	pro	asp	pro	lys	ala	pro	pro	460
gly	pro	thr	ser															464

FIG. 4E

Met	ser	ala	leu	tyr	arg	arg	phe	leu	thr	phe	gln	glu	val	val	gly	gln	glu	20		
his	val	lys	glu	pro	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	leu	40	
phe	ser	gly	pro	arg	gly	val	gly	thr	thr	ala	arg	arg	leu	ala	met	ala	val	60		
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	val	gln	arg	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	asn	ser	val	glu	asp	val	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	glu	pro	glu	arg	met	pro	pro	pro	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	phe	arg	leu	thr	glu	glu	glu	ile	ala	ala	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	arg	glu	arg	glu	ala	glu	glu	ala	leu	leu	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	phe	220
leu	leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	val	arg	ala	leu	gly	ser	pro	pro	pro	240
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	lys	thr	ala	glu	ala	leu	leu	260
gly	leu	ala	arg	arg	leu	tyr	gly	glu	gly	ala	pro	arg	ser	leu	val	ser	gly	leu	leu	280
leu	glu	val	phe	arg	arg	glu	leu	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	pro	300
ala	pro	pro	gln	ala	ala	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	leu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	glu	ala	gly	arg	ala	leu	leu	340
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	pro	360
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	ala	pro	asp	leu	arg	glu	arg	arg	380
trp	arg	ala	phe	leu	glu	ala	leu	ala	pro	thr	leu	arg	ala	phe	val	arg	glu	ala	arg	400
pro	glu	val	arg	glu	gly	gln	leu	leu	phe	ala	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	pro	leu	ala	gln	ala	his	phe	gly	val	val	440
glu	glu	val	val	leu	val	leu	glu	gly	lys	lys	lys	ala	ala	ala	ala	ala	ala	ala	ala	454

FIG. 4F

# ATP site

E.coli	MSYQVLARKWRPQTFADVVGQEHVLTALANGLSLGRHHAYLFSGTRGVGKTSIARLLAK	60
H.inf.	.....K.....II.....KDN.L.....F..	60
B.sub.	....A.Y.VF....R.E.....ITKT.Q.A.LQKKFS.....P..T....A.KIF..	60
C.cres.	DA.T.....Y..R..E.LI...AMVRT...AF.T...A..FMLT.V.....TT.....R	113
M.gen.	-MH..FYQ.Y..IN.KQTL...SIRKI.V.AINRDKLPNG.I...E..T...TF.KII..	59
T.th.	--VSA.Y.RF..L...QE.....KEP.LKAIRE..LAQ.....P.....TT.....M	58

## Zn<sup>++</sup> finger

\* \* \*

E.coli	GLNCET----GITATPCGVCDNCREIEQGRFVDLIEIDAASRTKVEDTRDLLDNVQYAPA	116
H.inf.	....VH----V.....E.E..KA...N.I.....E.....K.V	116
B.sub.	AV...H----APVDE..NE.AA.KG.TN.SIS.V.....NNG.DEI..IR.K.KF..S	116
C.cres.	A..Y..DTVK.PSVDLTTEGYH..S.IE..HM.VL.L.....DEM.E...G.R...V	173
M.gen.	AI..LN----WDQIDV.NS..V.KS.NTNSAI.IV.....KNGIN.I.E.VE..FNH.F	115
T.th.	AVG.QG-----EDP.....PH.QAVQR.AHP.VVD.....NNS...V.E.RERIHL..L	112

E.coli	RGRFKVYLIDEVHMLSRHSFNALLKTLEEPPEHVKFLLATDPQKLPVTILSRCLOFHLK	176
H.inf.	V.....I.....IGA.....CI.I...E.H.I.L..I...QR.DF..	176
B.sub.	EA.Y...I.....TAA.....P.A..IF...EIR.V.....QR.D.R	233
M.gen.	TEKK...IL..A...TTQ.WGG.....S.PY.L.IFT...EFN.I.L.....QS.FF..	175
T.th.	SAPR..FIL..A....KSA.....P..L.VF...E.ERM.P.....TQH.RFR	172

FIG.5A



E.coli	ALDVEQIRHQLEHILNEEHIAHEPRALQLLARAEGSLRDALSLTDQAIASGDGQ--VST	234
H.inf.	...ET..SQH.A...TQ.N.PF.DP..VK..K..Q..I..S.....M..R.--.TN	234
B.sub.	RITSQA.VGRMNK.VDA.QLQV.EGS.EII.S..H.GM.....L.....SFSGDI--LKV	234
C.cres.	RVEPDVLVKHFDR.SAK.GARI.MD..A.I.....V..G...L.....VQTERGQT.TS	293
M.gen.	KITSDL.LER.ND.AKK.K.KI.KD..IKI.DLSQ.....G...L..LAI..LIVKKL.LL	235
T.th.	R.TE.E.AFK.RR..EAVGREA.EE..L...L.D.A....E..LERFLLLEGP---LTR	229
E.coli	QAVSAMLGTLDDDDQALSLVEAMVEANGERVMA LINEAAARGIEWEALLVEMGLLHRIAM	294
H.inf.	NV..N...L...NYSVDILY.LHQG...LL.RTLQRV.DAAGD.DK..G.CAEK..Q..L	294
B.sub.	EDALLIT.AVSQLYIGK.AKSLHDK.VSDALETL..LLQQ.KDPAK.IED.IFYFRDMLL	294
C.cres.	TV.RD...LA.RS.TIA.Y.HVMAGKTKDALEGFRALWGF.ADPVVMLDV.DHC.AS.V	353
M.gen.	MLKKHLISLIEMQN.L.L.KQFYQ..I	260
T.th.	KE.ERA..SPPGTGVAEIAASLARGKTAEALG.ARRLYGE.YAPRS.VSGL.EVFREGLY	289

FIG.5B

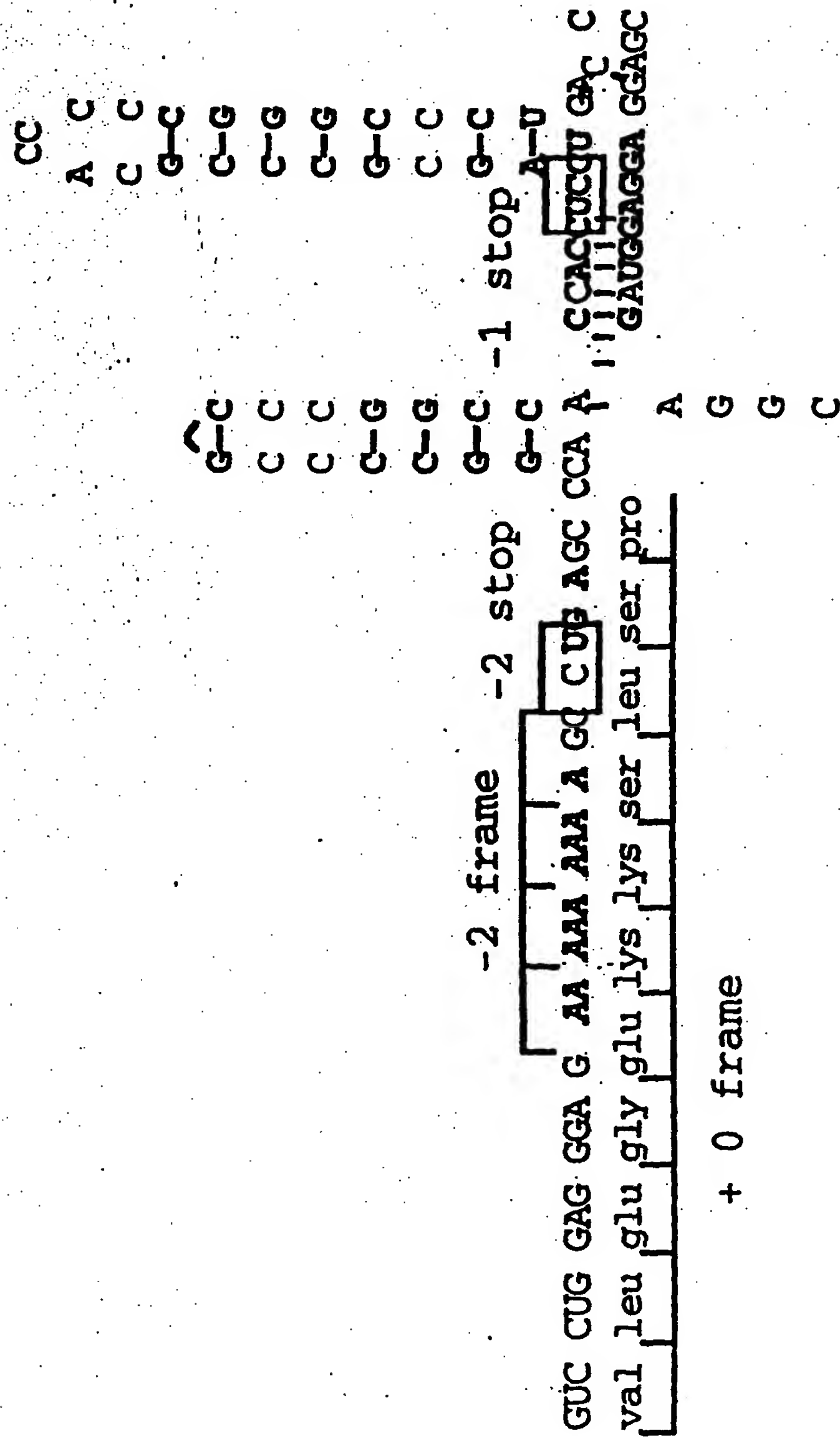


FIG.6

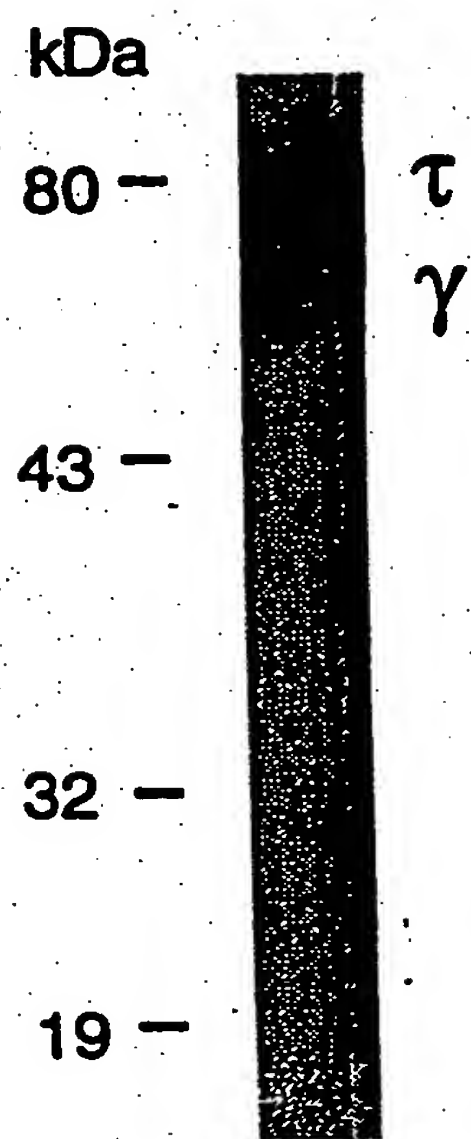
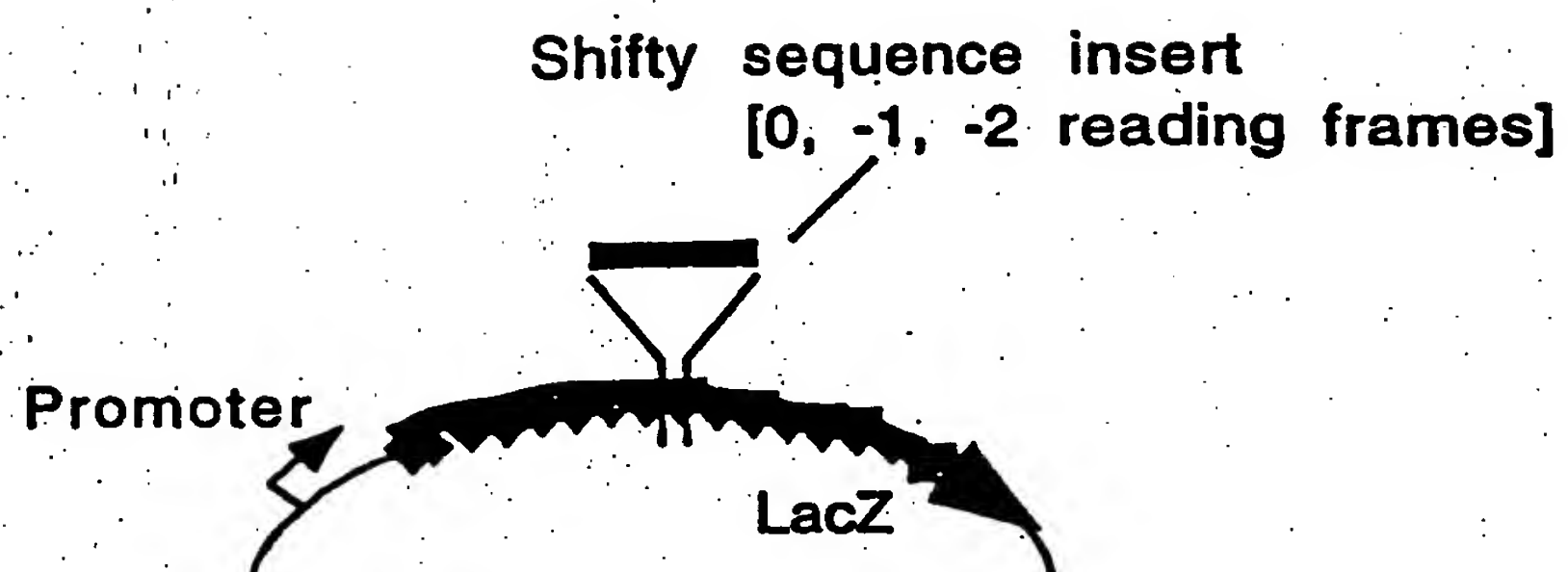


FIG. 7

# FIG.8A



	Reading frame	Blue	White
Shifty sequence	0	+	
	- 1	+	
	- 2	+	
Mutant sequence	0	++	
	- 1		+
	- 2		+

# FIG.8B

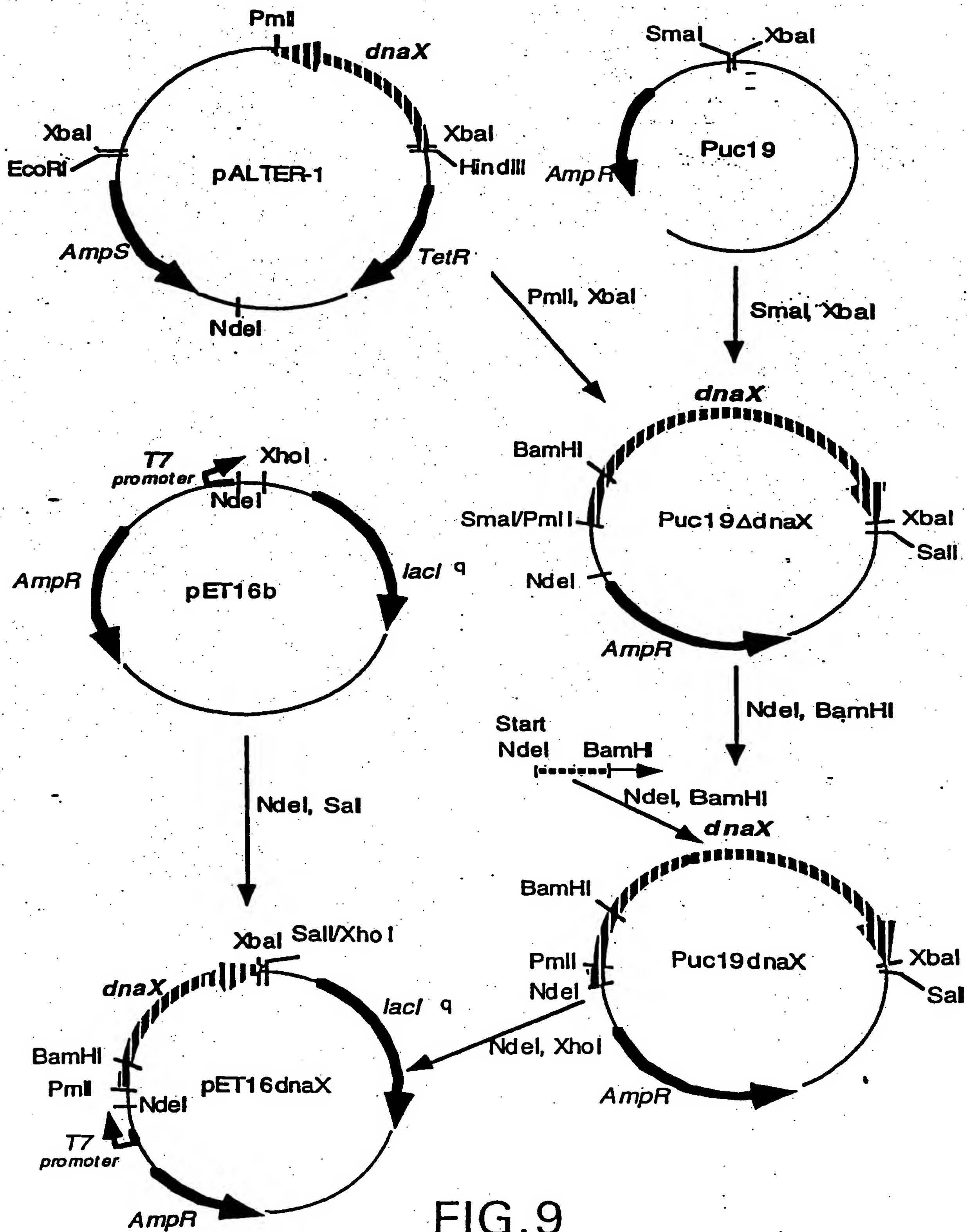


FIG.9

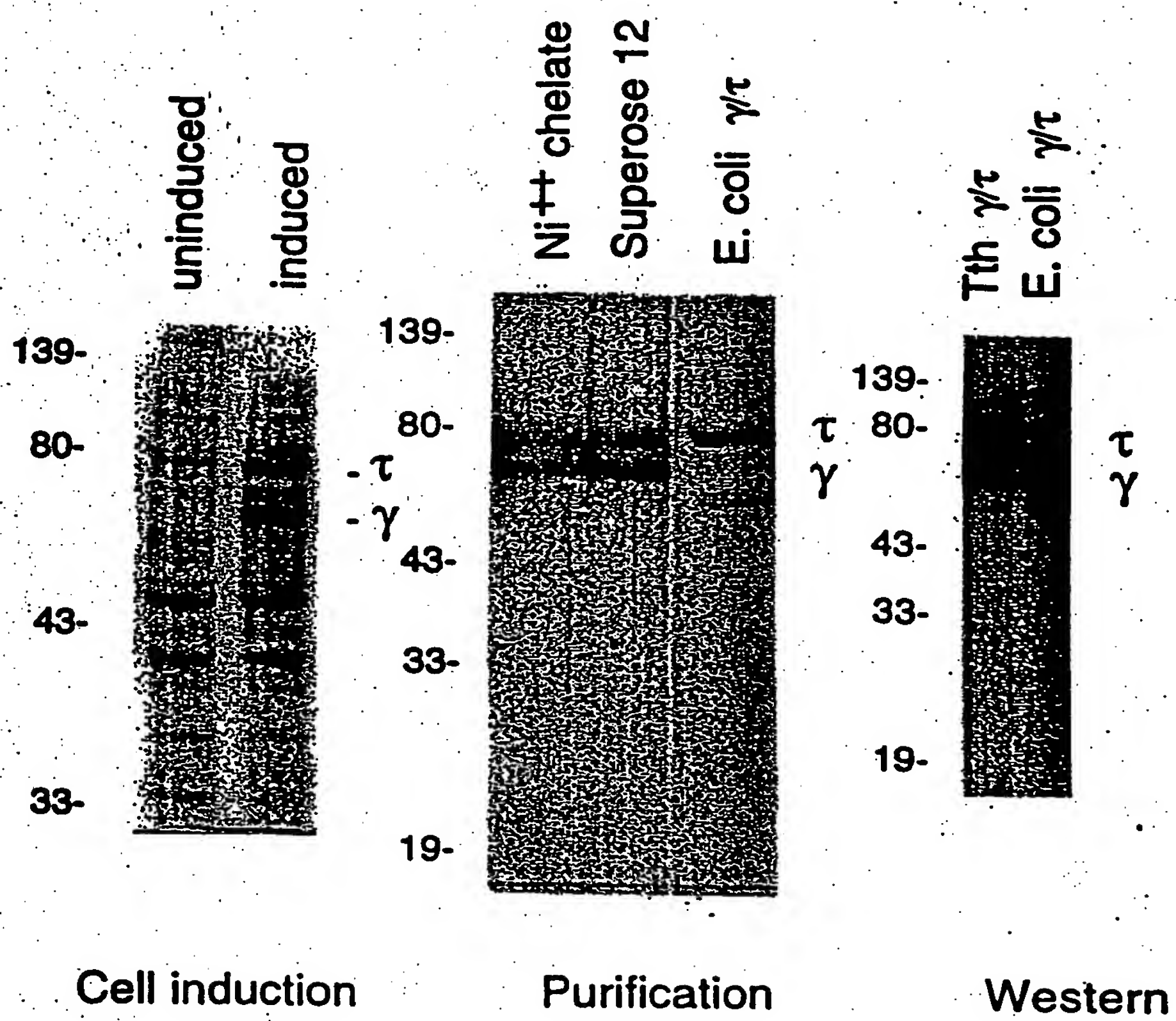


FIG.10A    FIG.10B    FIG.10C

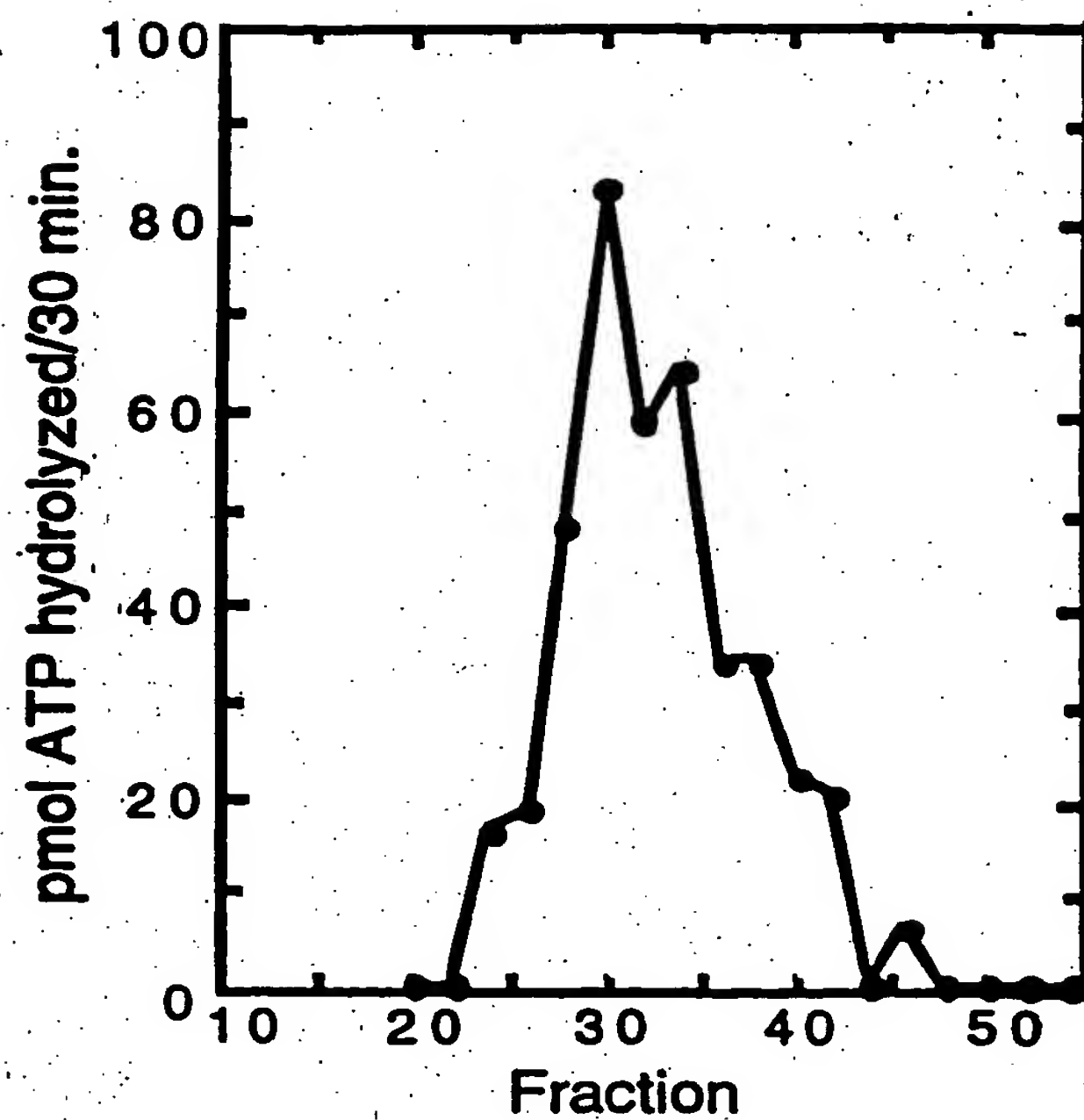


FIG. 11A

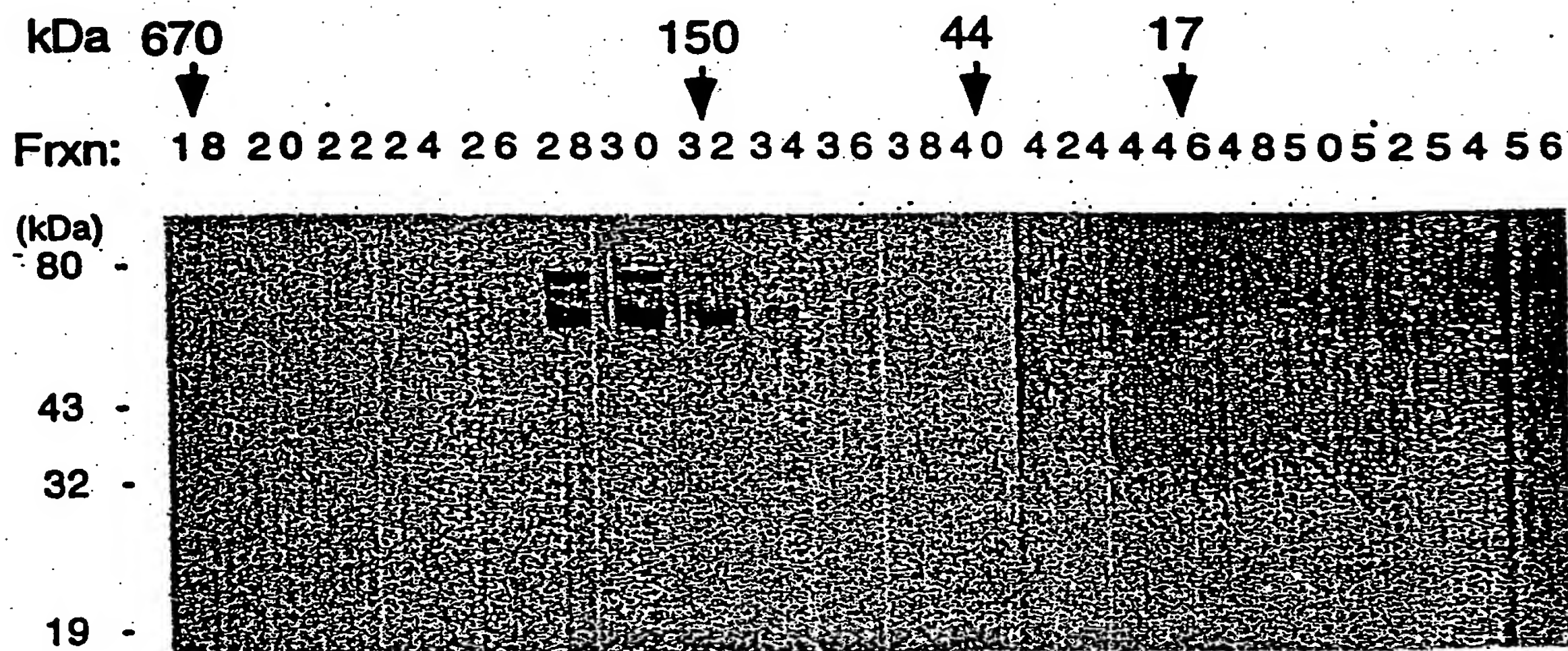


FIG. 11B

FIG.12A

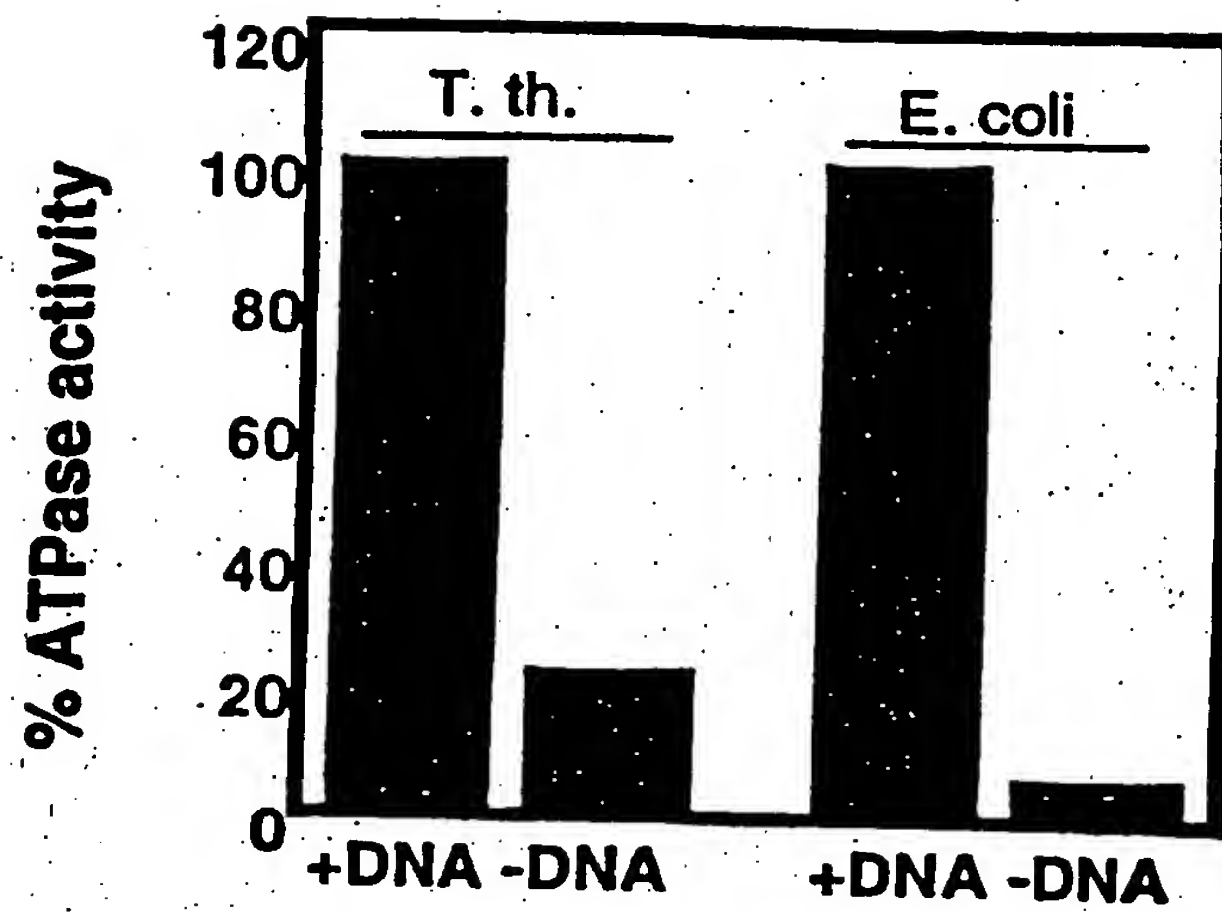


FIG.12B

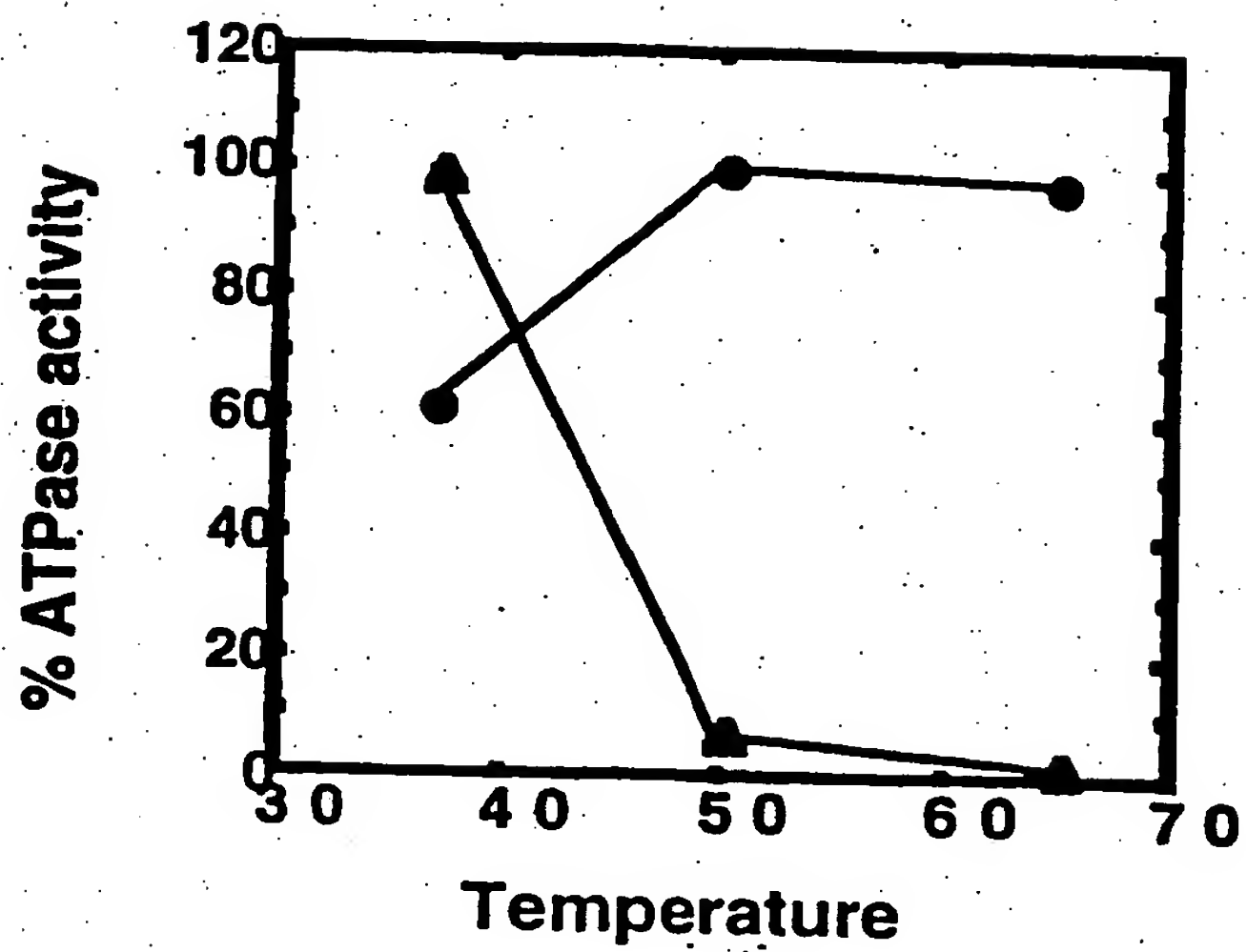
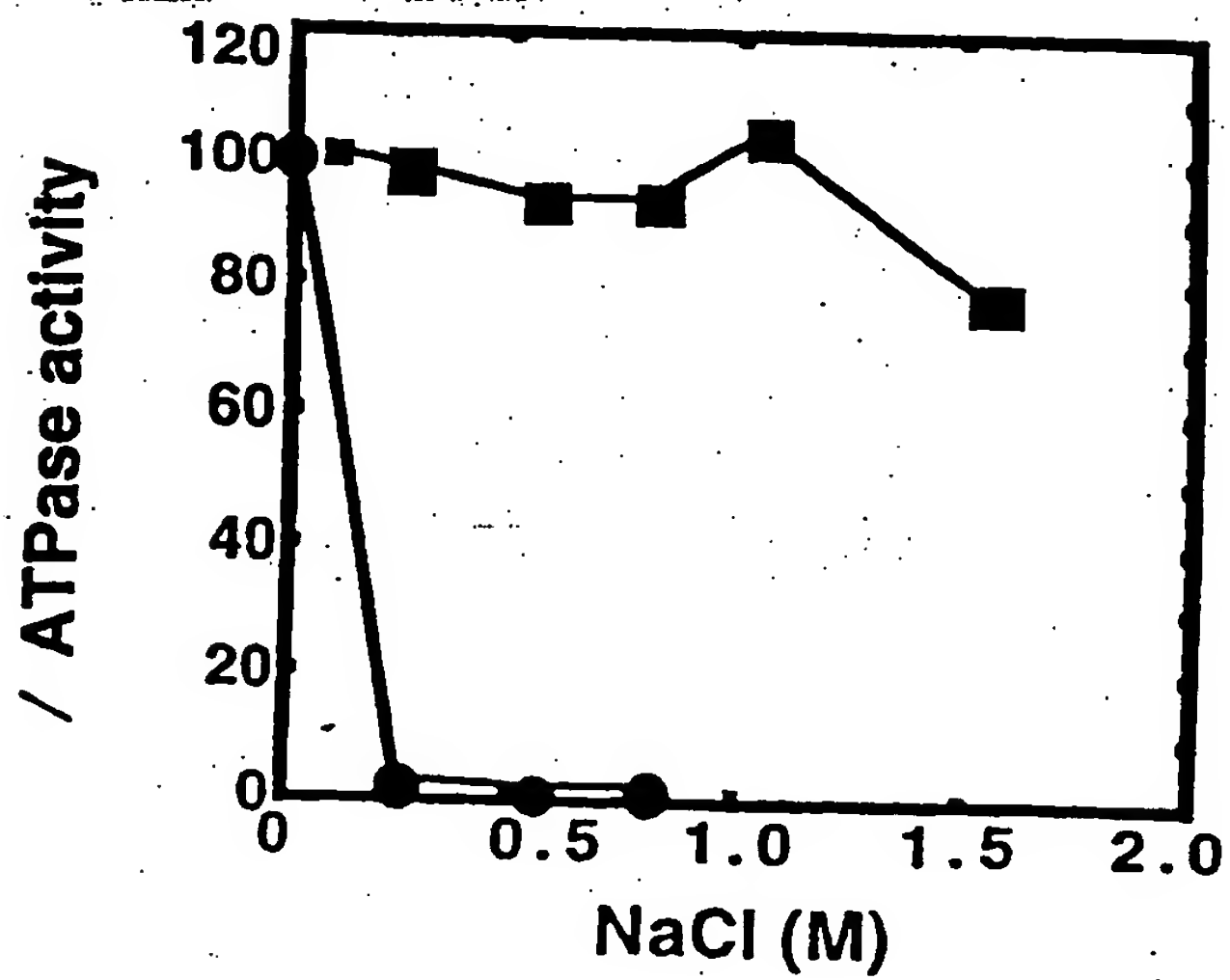
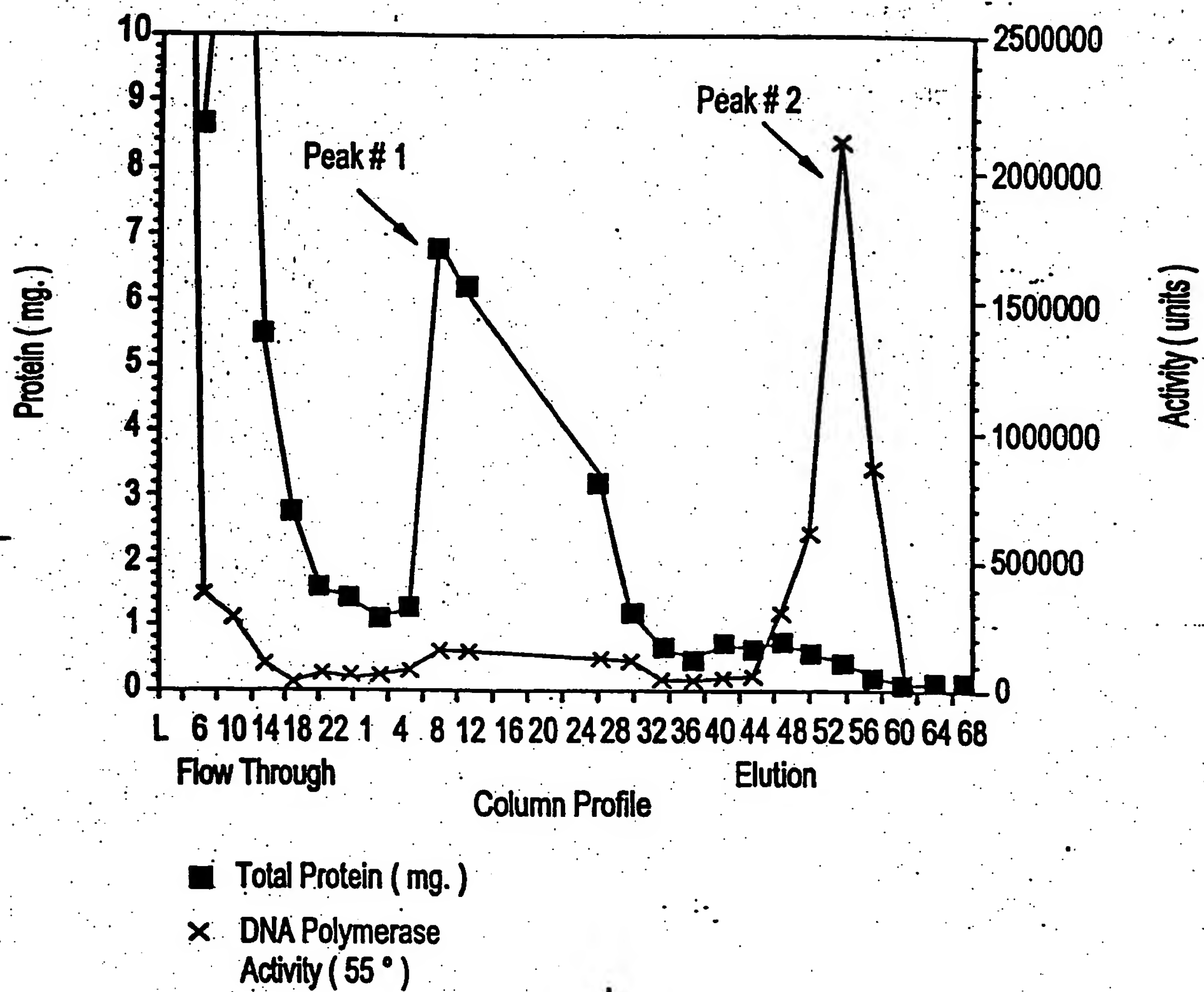


FIG.12C





# FIG.13A



# FIG.13B

ATP Agarose Step Column

FIG.13C

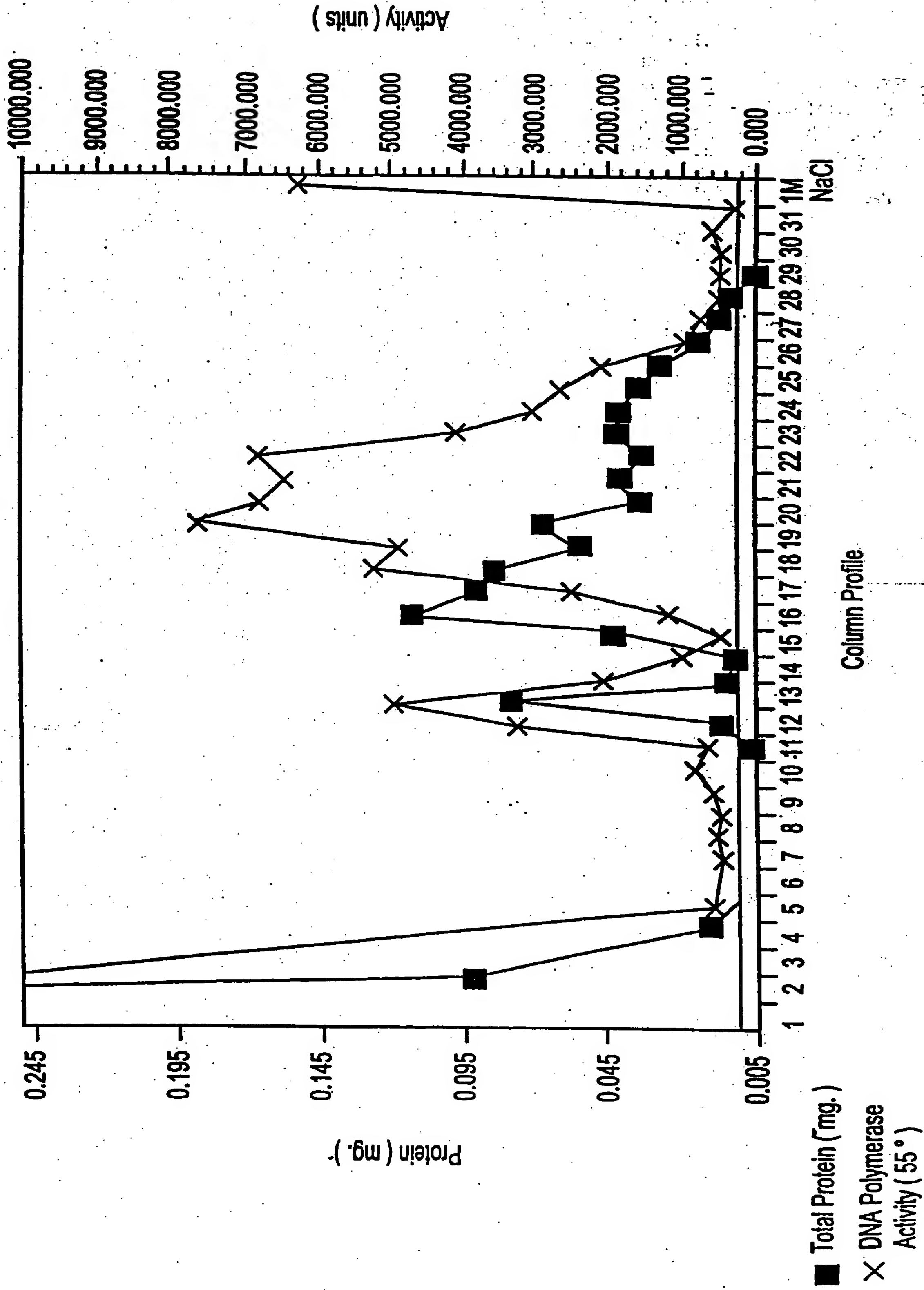
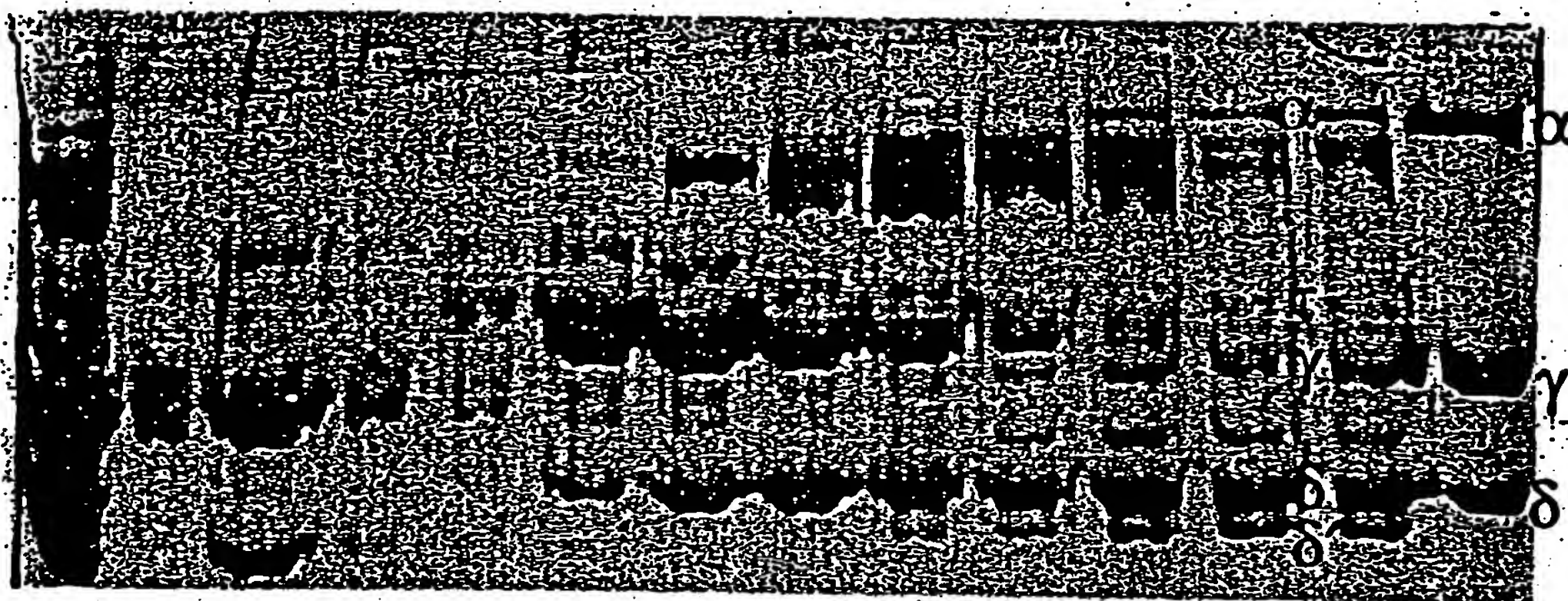


FIG.14A

load FT 9 10 11 12 13 14 15 16 17 18 19 E. coli  
α γ δ



↑ ↑  
T.th E. coli  
subunits subunits

FIG.14B

load FT 9 10 11 12 13 14 15 16 17 18 19



Alignment of TTH1 with alphas subunits of other organisms.

E.coli	DRYFLELIRTGRPDEESYLHAAVELAEARGLPVV	197	(ID#72)
V.chol.	DHFYLELIRTGRADEESYLHFDALDVAEQYDLPVV	197	(ID#73)
H.inf.	DHFYLALSRTPNEERYIQAAKLAEERCDLPLV	197	(ID#74)
R.prow.	DRFYFEIMRHDLPPEEQFIENSYIQIASELSIPV	195	(ID#75)
H.pyl.	DDFYLEIMRHGILDQRFIDEQVIKMSLETGLKII	213	(ID#76)
S.sp.	DDYYLEIQDHGVEDRLVNINLVKIAQELDIKIV	202	(ID#77)
M.tub.	DNYFLELMDHGLTIERRVRDGLLEIGRALNIPPL	220	(ID#78)
T.th.	FFIEIQNHGLSEQK		(ID#61)

FIG.15A

Alignment of TTH2 with alphas subunits of other organisms.

E.coli	NKRRAKNGEPPLDIAAIPLDDKKSFMDLQORSETTAVFQLESRGMKD	618	(ID#79)
V.chol.	NPRLKKAGKPPVRIEAIPLDDARSFRNLQDAKTTAVFQLESRGMKE	618	(ID#80)
H.inf.	NVRMVREGKPRVDIAAIPLDDPESFELLKRSETTAVFQLESRGMKD	618	(ID#81)
R.prow.	CKKLLKEQGIKIDFDDMTFDDKKTYQMLCKGKGVGFQFESIGMKD	624	(ID#82)
H.pyl.	LKI IKTQHKISVDFLSLDMDDPKVKYKTIQSGDTVGFQIES-GMFQ	648	(ID#83)
S.sp.	QERKALQIRARTGSKKLPDDVKKTHKLLLEAGDLEGIFQLESQGMKQ	643	(ID#84)
M.tub.	IDNVNRNGIDLDESVPDDKATYELLGRGDTLGVFQLDGGPMRD	646	(ID#85)
T.th.	RVELDYDALTLDD		(ID#60)

FIG.15B



ATGGGCGGGAGCTCCGCTTCGCCCACCTCCACCAGCACA	
CCCAGTTCTCCCTCCTGGACGGGGCGGCGAAGCTTTCCGA	
CCTCCTCAAGTGGGTCAAGGAGACGACCCCCGAGGACCCC	120
GCCTTGGCCATGACCGACCACGGCAACCTCTTCGGGGGCGG	
TGGAGTTCTACAAGAAGGCCACCGAAATGGGCATCAAGCC	
CATCCTGGGCTACGAGGCCTACGTGGCGGCGGAAAGCCGC	240
TTTGACCGCAAGCGGGGAAAGGGCCTAGACGGGGGCTACT	
TTACCTCACCTCCTCGCCAAGGACTTCACGGGGGTACCA	
GAACCTGGTGCGCCTGGCGAGCCGGGCTTACCTGGAGGGG	360
TTTTACGAAAAGCCCCGGATTGACCGGGAGATCCTGCGCG	
AGCACGCCGAGGGCCTCATCGCCCTCTCGGGGTGCCTCGG	
GGCGGAGATCCCCCAGTTCATCCTCCAGGACCGTCTGGAC	480
CTGGCCGAGGCCCGGCTCAACGAGTACCTCTCCATCTTCA	
AGGACCGCTTCTTCATCGAGATCCAGAACCACGGCCTCCC	
CGAGCAGAAAAGGTCAACGAGGTCTCAAGGAGTTCGCC	600
CGAAAGTACGGCCTGGGGATGGTGGCCACCAACGACGGCC	
ATTACGTGAGGAAGGAGGACGCCCGCGCCACGAGGTCCT	
CCTCGCCATCCAGTCCAAGAGCACCTTGGACGACCCCCGGG	720
CGCTGGCGCTTCCCCTGCGACGAGTTCTACGTGAAGACCC	
CCGAGGAGATGCGGGCCATGTTCCCCGAGGAGGAGTGGGG	
GGACGAGCCCTTTGACAACACCGTGGAGATCGCCCCGCATG	840
TGCAACGTGGAGCTGCCCATCGGGGACAAGATGGTCTACC	
GAATCCCCCGCTTCCCCCTCCCCGAGGGGCGGACCGAGGC	
CCAGTACCTCATGGAGCTCACCTTCAAGGGGCTCCTCCGC	960
CGCTACCCGGACCGGATCACCGAGGGCTTCTACCGGGAGG	
TCTTCCGCCTTTTGGGGAAGCTTCCCCCCCACGGGGACGG	
GGAGGCCTTGGCCGAGGCCTTGGCCCAGGTGGAGCGGGAG	1080
GCTTGGGAGAGGCTCATGAAGAGCCTCCCCCCTTTGGCCG	
GGGTCAAGGAGTGGACGGCGGAGGCCATTTTCCACCGGGC	
CCTTTACGAGCTTTCCGTGATAGAGCGCATGGGGTTTCCC	1200
GGCTACTTCCTCATCGTCCAGGACTACATCAACTGGGCCC	
GGAGAAACGGCGTCTCCGTGGGGCCCCGGCAGGGGGAGCGC	
CGCCGGGAGCCTGGTGGCCTACGCCGTGGGGATCACCAAC	1320
ATTGACCCCCCTCCGCTTCGGCCTCCTCTTTGAGCGCTTCC	
TGAACCCGGAGAGGGTCTCCATGCCCCGACATTGACACGGA	
CTTCTCCGACCGGGAGCGGGACCGGGTGATCCAGTACGTG	1440
CGGGAGCGCTACGGCGAGGACAAGGTGGCCCAGATCGGCA	
CCCTGGGAAGCCTCGCCTCCAAGGCCGCCCTCAAGGACGT	
GGCCCCGGGTCTACGGCATCCCCACAAGAAGGCGGAGGAA	1560
TTGGCCAAGCTCATCCCGGTGCAGTTCGGGAAGCCCAAGC	
CCCTGCAGGAGGCCATCCAGGTGGTGCCGGAGCTTAGGGC	
GGAGATGGAGAAGGACCCCAAGGTGCGGGAGGTCCTCGAG	1680
GTGGCCATGCGCCTGGAGGGCCTGAACCGCCACGCCTCCG	
TCCACGCCGCGGGGTGGTGATCGCCGCCGAGCCCCCTCAC	
GGACCTCGTCCCCCTCATGCGCGACCAGGAAGGGCGGCCC	1800
GTCACCCAGTACGACATGGGGGCGGTGGAGGCCTTGGGGC	
TTTTGAAGATGGACTTTTTTGGGCCTCCGCACCCTCACCTT	

FIG. 16A

CCTGGACGAGGTCAAGCGCATCGTCAAGGCGTCCCAGGGG	1920
GTGGAGCTGGACTACGATGCCCTCCCCCTGGACGACCCCA	
AGACCTTCGCCCTCCTCTCCCGGGGGGAGACCAAGGGGGT	
CTTCCAGCTGGAGTCGGGGGGGATGACCGCCACGCTCCGC	2040
GGCCTCAAGCCGCGGCGCTTTGAGGACCTGATCGCCATCC	
TCTCCCTCTACCGCCCCGGGCCCATGGAGCACATCCCCAC	
CTACATCCGCCGCCACCACGGGCTGGAGCCCGTGAGCTAC	2160
AGCGAGTTTCCCCACGCCGAGAAGTACCTAAAGCCCATCC	
TGGACGAGACCTACGGCATCCCCGTCTACCAGGAGCAGAT	
CATGCAGATCGCCTCGGCCGTGGCGGGGTACTCCCTGGGC	2280
GAGGCGGACCTCCTGCGGCGGTCCATGGGCAAGAAGAAGG	
TGGAGGAGATGAAGTCCCACCGGGAGCGCTTCGTCCAGGG	
GGCCAAGGAAAGGGGCGTGCCCCGAGGAGGAGGCCAACCGC	2400
CTCTTTGACATGCTGGAGGCCTTCGCCAACTACGGCTTCA	
ACAAATCCCACGCTGCCGCCTACAGCCTCCTCTCCTACCA	
GACCGCCTACGTGAAGGCCCACTACCCCGTGGAGTTCATG	2520
GCCGCCCTCCTCTCCGTGGAGCGGCACGACTCCGACAAGG	
TGGCCGAGTACATCCGCGACGCCCGGGCCATGGGCATAGA	
GGTCCTTCCCCCGGACGTCAACCGCTCCGGGTTTGACTTC	2640
CTGGTCCAGGGCCGGCAGATCCTTTTCGGCCTCTCCGCGG	
TGAAGAACGTGGGCGAGGCGGCGGCGGAGGCCATTCCTCCG	
GGAGCGGGAGCGGGGCGGCCCTACCGGAGCCTCGGCGAC	2760
TTCTCAAGCGGCTGGACGAGAAGGTGCTCAACAAGCGGA	
CCCTGGAGTCCCTCATCAAGGCGGGCGCCCTGGACGGCTT	
CGGGGAAAGGGCGCGGCTCCTCGCCTCCCTGGAAGGGCTC	2880
CTCAAGTGGGCGGCCGAGAACCGGGAGAAGGCCCGCTCGG	
GCATGATGGGCCTCTTCAGCGAAGTGAGGAGCCGCCTTT	
GGCCGAGGCCGCCCCCCCTGGACGAGATCACCCGGCTCCGC	3000
TACGAGAAGGAGGCCCTGGGGATCTACGTCTCCGGCCACC	
CCATCTTGCGGTACCCCGGGCTCCGGGAGACGGCCACCTG	
CACCCTGGAGGAGCTTCCCCACCTGGCCCCGGGACCTGCCG	3120
CCCCGGTCTAGGGTCCTCCTTGCCGGGATGGTGGAGGAGG	
TGGTGCACAAGCCCAAAAGAGCGGCGGGATGATGGCCCCG	
CTTCGTCTCTCCGACGAGACGGGGGCGCTTGAGGCGGTG	3240
GCATTCGGCCGGGCCTACGACCAGGTCTCCCCGAGGCTCA	
AGGAGGACACCCCCGTGCTCGTCCTCGCCGAGGTGGAGCG	
GGAGGAGGGGGGCGTGCGGGTGCTGGCCCAGGCCGTTTGG	3360
ACCTACGAGGAGCTGGAGCAGGTCCCCCGGGCCCTCGAGG	
TGGAGGTGGAGGCCTCCCTCCTGGACGACCGGGGGGTGGC	
CCACCTGAAAAGCCTCCTGGACGAGCACGCGGGGACCCTC	3480
CCCCTGTACGTCCGGGTCCAGGGCGCCTTCGGCGAGGCC	
TCCTCGCCCTGAGGGAGGTGCGGGTGGGGGAGGAGGCTGT	
AGGCGGCCGCGTGGTTCCGGGCCTACCTCCTGCCCGACCG	3600
GGAGGTCCTTCTCCAGGGCGGCCAGGCGGGGGAGGCCAG	
GAGGCGGTGCCCTTCTAGGGGGTGGGCCGTGAGACCTAGC	
GCCATCGTTCTCGCCGGGGGCAAGGAGGCCTGGGCCCGAC	3720
CCCTTTTGG	

FIG. 16B

MGRELRF AHLHQHTQFSLLDGAPKLSDLLKWVEETTPEDP	
ALAMTDHGNLFGAVEFYKKATEMGIKPILGYEAYVAAESR	
FDRKRKGKGLDGGYFHLTLLAKDFTGYQNLVRLASRAYLEG	120
FYEKPRIDREILREHAEGLIALSGCLGAEIPQFILQDRLD	
LAEARLNEYLSIFKDRFFIEIQNHGLPEQKKVNEVLKEFA	
RKYGLGMVATNDGHYVRKEDARAHEVLLAIQSKSTLDDPG	240
ALALPCEEFYVKTPEEMRAMFPEEEVGGRSPLTTPWRSPPH	
VQRGAAIGTRWSTRIPRFPLPEGRTEAQYLMELTFKGLLR	
RYPDRITEGFYREVFRLSGKLPPHGDGEALAEALAQVERE	360
AWERLMKSLPPLAGVKEWTAEAI FHRALYELSAIERMGFP	
GLLPHRPGHLHQLGPEKGVSVGPGRGGAAGSLVAYAVGITN	
IDPLRFGLLFERFLNPERVSMPTDIDTDFSDRERDRVIQYV	480
RERYGEDKVAQIGTLGSLASKAALKEVARVYGI PRKKAEE	
LAKLIPVQFGKPKPLQEAIQVVP ELRAEMEKDPKVREVLE	
VAMRLEGLNRHASVHAGRGGVFSEPLTDLVPLCATRKGGP	600
YTQYDMGAVEALGLLKMDFLGLRTL TFLDEVKRIVKASQG	
VELDYDALPLDDPKTFALLSRGETKGVFQLESGGMTATLR	
GLKPRRFEDLIAILSLYRPGPMEHIPTYIRRHGLEPVSY	720
SEFPHAEKYLKPILDETYGIPVYQEQIMQIASAVAGYSLG	
EADLLRRSMGKKKVEEMKSHRERFVQGAKE RGVPEEEANR	
LFDMLEAFANYGFNKSHAAAYSLLSYQTAYVKAHYPVEFM	840
AALLSVERHDSKVAEYIRDARAMGIEVLPPDVNRSGFDF	
LVQGRQILFGLSAVKNVGEAAAEAILRERERGGPYRSLGD	
FLKRLDEKVLNKR TLES LIKAGALDGFGERARLLASLEGL	960
LKWAAENREKARSGMMGLFSEVEEPPLAEAAPLDEITRLR	
YEKEALGIYVSGHPILRYPG LRETATCTLEELPHLARDLP	
PRSRVLLAGMVEEVVRKPTKSGGM MARFVLSDETGALEAV	1080
AFGRAYDQVSPRLKEDTPVLVLAEVEREEGGVRVLAQAVW	
TYQELEQVPRALEVEVEASLPDDRGV AHLKSLLDEHAGTL	
PLYVRVQGA FGEALLALREVRVGEEALGALEAAGFPAYLL	1200
PNREVSPRLTGSGGPRGRALSTGLALKTYP IALPGGNEAL	
ARPLL	

FIG. 16C

	Start1	Start2	3'-Exo I
T.th.	VERVVRTLLDGRFLLEEGVGLWENRYPF	LEGEAVVLDLETTGLAG-----	LDEVIEVGLLRLEGG---RRLPF
D.rad.		PWPQDVVVFDDLETTGFSPA-----	SAAIVEIGAVRIVGGQIDETLKF
Bac.sub.	HGIKMIYGMEANLVDDGVPIAYNAAHRLLEE	ETYYVVFDDVETTGLSAV-----	YDTIIELAAVKVKGE---IIDKF
H.inf.		MINPNRQIVLDTETTGMMNQLGAHYEGHCII	IEIGAVELINRR-YTGNNX
E.c.		MSTAITRQIVLDTETTGMMNQIGAHSEGHKII	IEIGAVEVNNRR-LTGNNF
H.py1.	NLEYLKACGLNFIETSENLITLKNLKTPLKDE	VFSFIDLETTGSCPI-----	KHEILLEIGAVQVKGE---IINRF

	3'-Exo II
T.th.	QSLVR-PLPP---AEARSWNLT---GIPREALEAPSLEEVLKAYPLRGDATLVIHNAAFDLGFL-RPALEGLG
D.rad.	ETLVR-PTRPDGSMLSI PWQAQRVHGISDEMVRRAPAXKDVLPDFDFVDGSAVVAHNVSFDGGFM-RAGAERLG
Bac.sub.	EAFAN-PHRP---LSATIIELT---GITDDMLQDAPVDVIRDFREWIGDDILVAHNASFDMGFL-NVAYKKLL
H.inf.	HIYIK-PDRP---XDPDAIKVH---GITDEMLADKPEFKEVAQDFLDYINGAELLIHNAFPDVGFM-DYEFRRKLN
E.c.	HVYLK-DRLV---DPEAFGVH---GIAVDFLLDKPTFAEVAVEFMDYIRGAELVHNAAFDIGFM-DYEFSLLK
H.py1.	ETLVKVSVP-----DYIAELT---GITYEDTLNAPSAHEALQELRLFLGNSVFAHNANFDYNFLGRYFVEKLH

	3'-Exo IIIC
T.th.	-----YRLENPVVDSLRLARRGLPGLRRYGLDALSEVLELPRRT--CHRALEDVERTLAVHEVYYMLT-----SG
D.rad.	-----LSWAPERELCTMQLSRRAFPFRERTHNLTVLAERLGLEFAPGGRHRSYGDVQVTAQAYLRLLLELLG-----ER
Bac.sub.	E---VEKAKNPVIDTLELGRFLYPEFKNHRNLNTLCKKEDIELTQ--HHRALYDTEATAYLLLKMLKDA-----EK
H.inf.	-LNVKTDDICLVTDTLQMARQMPGKRN-NLDALCDRLGIDNSKRTLHGALLDAEILADVYLMMTGGQTNLFDEEE
E.c.	RDIAKTNTFCKVTDLSLAVARKMFPGKRN-SLDALCARYEIDNSKRTLHGALLDAQIILAEVYLAMTGGQTSMAFAME
H.py1.	-----CPLNLNLKICTLDLSKRAILSMRY-SLSFLKELLGFGIEV--SHRAYADALASYKLFECICLLNLP--SYIKT

FIG.17



## FIG.18A

ATGGTGGAGCGGGTGGTGCGGACCCTTCTGGACGGGAGGT 40  
TCCTCCTGGAGGAGGGGGTGGGGCTTTGGGAGTGGCGCTA  
CCCCTTTCCCCTGGAGGGGGGAGGCGGTGGTGGTCCTGGAC 120  
CTGGAGACCACGGGGCTTGCCGGCCTGGACGAGGTGATTG  
AGGTGGGCCTCCTCCGCCTGGAGGGGGGGAGGCGCCTCCC 200  
CTTCCAGAGCCTCGTCCGGCCCCCTCCCGCCCCGCCGAAGCC  
CGTTCGTGGAACCTCACCGGCATCCCCCGGGAGGCCCTGG 280  
AGGAGGCCCCCTCCCTGGAGGAGGTTCTGGAGAAGGCCTA  
CCCCCTCCGCGGGCGACGCCACCTTGGTGATCCACAACGCC 360  
GCCTTTGACCTGGGGCTTCCTCCGCCCCGGCCTTGGAGGGCC  
TGGGCTACCGCCTGGAAAACCCCGTGGTGGACTCCCTGCG 440  
CTTGGCCAGACGGGGCTTACCAGGCCTTAGGCGCTACGGC  
CTGGACGCCCTCTCCGAGGTCCTGGAGCTTCCCCGAAGGA 520  
CCTGCCACCGGGGCCCTCGAGGACGTGGAGCGCACCCCTCGC  
CGTGGTGCACGAGGTATACTATATGCTTACGTCCGGCCGT 600  
CCCCGCACGCTTTGGGAACTCGGGAGGTAG

MVERVVRTLLDGRFLLEEGVGLWEWRYPFPLEGEAVVVD 40  
LETTGLAGLDEVIEVGLLRLEGGRRLPFQSLVRPLPPAEA  
RSWNLTGIPREALEEAPSLEEVLEKAYPLRGDATALVIHNA 120  
AFDLGFLRPALEGLGYRLENPVVDSLRLARRGLPGLRRYG  
LDALSEVLELPRRTCHRALEDVERTLAVVHEVYYMLTSGR 200  
PRTLWELGRZ

## FIG.18B

# Alignment of dnaA genes.

P.mar.	MLEASWEK	VQSSL--KQNLK--	-----PSYE	TWIRTEFG--FKN	GELTLIAPNSFSSAW	LKNYSQTIQETAE-	65
Syn.sp.	MVSCENLWQQ	ALAIL--ATQLTK--	-----PAFD	TWIKASVLIS--LGD	GVATIQVENGFLVLAH	LQSYGPIILMEVLT-	67
B.sut.	MENILDLWNQ	ALAQI--EKQLSK--	-----PSFE	TWIKSTKAHS--LQG	DTLTITAPNEFARDW	LESRYLHLIADTIY-	67
M.tub.	MTDDPGSGFTTVWNA	VVSELNGDPKVDGDP	SSDANLSAPLTPQQR	AWNLVQPLT---IVE	GFALLSVPSFVQNE	IERHLRAPITDALS-	87
T.th.	MSHEAVWQH	VLEHI--RRSITE--	-----VEFH	TWFERIRPLG---IRD	GVLELAVPTSFALDW	IRRHVAGLIQEGPR-	66
E.coli	MSLSLWQQ	CLARL--QDELPA--	-----TEFS	MWIRPLQAE---LSD	NTLALYAPNRFVLDW	VRDKYLANNINGLLT-	64
T.mar.	MKER	ILQEI--KTRVNR--	-----KSWE	LWFSSEFVKS---IEG	NKVVFSVGNLFKEW	LEKKYYSVLSKAVK-	61
H.pyl.	MDTNNNIEKE	ILALVKQNPKVSL--	-----IEYE	NYFSQLKYNPNASKS	DIAFFYAPNQVLCTT	ITAKYGALLKEILSQ	72

P.mar.	EIFG---	EPVTVHVK	VKANAESSDEHYSSA	P-----	ITPPLEASPGSV	DSSGSSLRLSK----	-KTLPLNLRYVFNR	130
Syn.sp.	DLTG---	QEITVKLI	TDGLEPHS---	LIGQ	E-----	SSLPMETTP----	-KNATALNGKYTFSR	115
B.sut.	ELTG---	EELSIKVV	IPQNDQVEDEMPQPQ	VKKAVKEDTSDFPQN	-----	-----	-----MLNPKYTFDT	119
M.tub.	RRLGH-QIQIGVRIA	PPATDEADDTTVPPS	ENPATTSPDITTDND	EIDDSAAARGDNQHS	WPSYFTEPHNTDSA	TAGVTSINRRYTFDT	-----	176
T.th.	LLGAQ-APREFELRVV	PGVVQEDIFQPPPS	PPAQAP-----	-----	-----	-----EDTFKT	-----	108
E.coli	SFCGADAPQLREFVG	TKPVTQTPQAAVTSN	VAAPAQVAQTQPORA	APSTRSGWNVPAPEP	-----	-----	-TYRSNVNVKHTFDN	140
T.mar.	VVLG---NDATFEIT	YEAFEPHSSYSEPLV	KKRAVLLTP-----	-----	-----	-----LNPDYTFEN	-----	106
H.pyl.	NKVG-MHLAHSVDVR	IEVAPKIQINAQSN	NYKAIKTS-----	-----	-----	-----VKDSYTFEN	-----	118

P.mar.	FVVGPNSRMAHAAAM	AVAESPGRFENPLFI	CGGVGLGKTHLMQAI	CHYRLIEDPGAKVSY	VSTETFTNDLIL---	A	IRQDRMQAERDRYR-	217
Syn.sp.	FVVGPNTNRMAHAASL	AVAESPGRFENPLFL	CGGVGLGKTHLMQAI	AHYRLEMYPNAKVY	VSTERFTNDLIT---	A	IRQDNMEDFRSYR-	202
B.sut.	FVIGSGNRFAHAASL	AVAEPAPAKAYNPLFI	YGGVGLGKTHLMHAI	GHYVIDHNPSAKVY	LSSEKFTNEFIN---	S	IRDNKAVDFRNRYR-	206
M.tub.	FVIGASNRFAHAAAL	AIAEAPARAYNPLFI	WGESGLGKTHLLHAA	GNYAQRLFRGMRVKY	VSTEEFTNDFIN---	S	LRDDRKVAFRRSYR-	263
T.th.	SMWGPTTPWPHGGAV	AVAESPGRAYNPLFI	YGGRGLGKTYLMAHAY	GPLRAKRFPHMRLEY	VSTETFTNELINRPS	AR-DRMTIEFRERYR-	196	
E.coli	FVEGKSNQLARAAAR	QVADNPGGAYNPLFL	YGGTGLGKTHLLHAV	GNGIMARKPNKVVY	MHSERFVQDMVK---	A	LONNAIEEFKRYR-	227
T.mar.	FVVGPGNSFAYHAAL	EVAKHPGR--YNPLFI	YGGVGLGKTHLLQSI	GNVYVQNEPDLRVMY	ITSEKFLNDLVD---	S	MKEGKLINEFREKYR	193
H.pyl.	FVVGSCNNTVVEIAK	KVAQSDTPPNPVL	F	YGGTGLGKTHLLNAI	GNHALEK--HKKVL	VTSEDFLTDFLK--H	LDNKTMDSEKAKYR-	203

FIG.19A

P.mar.	AADLILVDDIQFIEG	KEYTQEEFFHTFNAL	HDAGSQIVLASDRPP	SQIPRLQERLMSRFS	MGLIADVQAPDLETR	MAILQKKAHERVGL	307
Syn.sp.	SADFLLLIDDIQFIKG	KEYTQEEFFHTFNLSL	HEAGKQVWVASDRAP	QRIPGLQDRLLSRFS	MGLIADIOVPDLETR	MAILQKKAEDRIRL	292
B.sut.	NVDVLLIDDIQFLAG	KEQTQEEFFHTFNIL	HEESKQIVISSDRPP	KEIPTLEDRLRSRFE	WGLITDITPPDLETR	TAILRKKAKAEGLDI	296
M.tub.	DVDVLLVDDIQFIEG	KEGQEEFFHTFNIL	HNANKQIVISSDRPP	KQIATLEDRLRTRFE	WGLITDVQPPPELETR	TAILRKKAQMERLAV	353
T.th.	SVDLLLVDDVQFLAG	KERTQEEFFHTFNAL	YEAHKQIILSSDRPP	KDILTLEARLSRFE	WGLITDNPAPDLETR	TAILKMNAS--SGPED	285
E.coli	SVDALLIDDIQFFAN	KERSQEEFFHTFNAL	LEGNQIILTSDRYP	KEINGVEDRLKSRFG	WGLTVAIEPPPELETR	VAILMKKADENDIRL	317
T.mar.	KVDILLIDDVQFLIG	KIGVQTELFHTFNEL	HDSGKQIVICSDREP	QKLSEFQDRLVSRFQ	MGLVAKLEPPDEETR	KSIARKMLEIEHGEL	283
H.pyl.	HCDFFLDDAQFLOQ	KPKLEEEFFHTFNEL	HANSKQIVLISDRSP	KNIAGLEDRLKSRFE	WGITAKVMPDLETK	LSIVKQKQCQLNQITL	293

P.mar.	PRDLIQFIAGRFTSN	IRELEGALTRAIAFA	SITGLPMTVDSIAPM	LD-----PNGQGEVET	PKQVLDKVAEVFKVT	PDEMRSASRRR--PVS	392
Syn.sp.	PKEVIEYIASHYTSN	IRELEGALIRAIAYT	SLSNVAMTVENIAPV	LN-----PPVEKVAAA	PETITITIVAQHYQLK	VEELLSNSRRR--EVS	377
B.sut.	PNEVMLYIANQIDSN	IRELEGALIRVWAYS	SLINKDINADLAAEA	LKDII--PSSKPKVIT	IKEIORVVGQQFNIK	LEDFKAKKRTK--SVA	384
M.tub.	PDDVLELIASSIERN	IRELEGALIRVTAF	SLNKTPIDKALAEIV	LRDLI--ADANTMQIS	AATIMAATAEYFDTT	VEELRGPGKTR--ALA	441
T.th.	PEDALEYIARQVTSN	IREWEGALMRASPPA	SLNGVELTRAVAACA	LRHLR--P---RELEAD	PLEIIRKAAAGPVRPE	TPGGAHGERRKKEVV	372
E.coli	PGEVAFFIAKRLRSN	VRELEGALNRVIANA	NFTGRAITIDFVREA	LRDLL--A--LQEKLV	IDNIOKTVAEYKIK	VADLLSKRRSR--SVA	404
T.mar.	PEEVLNFWAENVDDN	LRRLRGAIKLLVYK	ETTGKEVDLKEAILL	LKDFIKPNRVKAMD	IDELIEIVAKVTGVP	REEILSNSRNV--KAL	372
H.pyl.	PEEVMEYIAQHISDN	IROMEGAIKISVNA	NLMNASIDILNLAKTIV	LEDL--QKDHAEGSS	LENILLAVAQSLNLK	SSEIKVSSRQK--NVA	380

P.mar.	QARQVGMVLMRQGTN	LSLPRIGDTFGGKDH	TTVMYAIEQVEKKLS	S-----DPQIA	SQVQKIRDLLQIDSR	RKR----	461
Syn.sp.	LARQVGMVLMRQHTD	LSLPRIGEAFGGKDH	TTVMYSCDKITQLQ	K-----DWETS	QTLTSLSHRINIAGQ	APES----	447
B.sut.	FPRQIAMVLSREMTD	SSLPKIGEEFGGRDH	TTVIHAHEKISKLLA	D-----DEQLQ	QHVKEIKEQLK----	-----	446
M.tub.	QSRQIAMVLCRELTD	LSLPKIGQAFG-RDH	TTVMYAQRKILSEMA	E-----RREVF	DHVKELTTRIRORSK	R-----	507
T.th.	LPRQIAMVLRRELTP	ASLPEIGQLFGGRDH	TTVRYAIQKVQELAG	KP-----DREVQ	GLLRTIReactDPVD	NLWITCG	446
E.coli	RPRQMAMALAKELTN	HSLPEIGDAFGGRDH	TTVLHACRKEIQLRE	E-----SHDIK	EDFSNLIRTLSS----	-----	467
T.mar.	TARRIGMVVAKNYLK	SSLRTIAEFN-RSH	PVVVDSVKKVKDSLL	KG-----NKQLK	ALIDEVIGEISRRAL	SG-----	440
H.pyl.	LARKLVVYFARLYTP	NPTLSLAQFLDLKDH	SSISKMYSGVKQMLE	EKSPFVLSLREEIK	NRLNELNDKKTAFNS	SE-----	457

FIG.19B



GTGTCGCACGAGGCCGTCTGGCAACACGTTCTGGAGCA<sup>-</sup>CA  
 TCCGCCGCAGCATCACCGAGGTGGAGTTCACACCTGGTT  
 TGAAAGGATCCGCCCCCTTGGGGATCCGGGACGGGGTGCTG 120  
 GAGCTCGCCGTGCCACCTCCTTTGCCCTGGACTGGATCC  
 GGCGCCACTACGCCGGCCTCATCCAGGAGGGCCCTCGGCT  
 CCTCGGGGCCCAGGCGCCCCCGGTTTGAGCTCCGGGTGGTG 240  
 CCCGGGGTCTGTAGTCCAGGAGGACATCTTCCAGCCCCCGC  
 CGAGCCCCCGGCCCAAGCTCAACCCGAAGATACCTTTAA  
 AACTTCGTGGTGGGGCCCAACAACCTCCATGGCCCCACGGC 360  
 GGCGCCGTGGCCGTGGCCGAGTCCCCCGGCCGGGCCTACA  
 ACCCCCTCTTCATCTACGGGGGCCGTGGCCTGGGAAGAC  
 CTACCTGATGCACGCCGTGGGCCCACTCCGTGCGAAGCGC 480  
 TTCCCCCACATGAGATTAGAGTACGTTTCCACGGAACTT  
 TCACCAACGAGCTCATCAACCGGCCATCCGCGAGGGACCG  
 GATGACGGAGTTCCGGGAGCGGTACCGCTCCGTGGACCTC 600  
 CTGCTGGTGGACGACGTCCAGTTCATCGCCGGAAAGGAGC  
 GCACCCAGGAGGAGTTTTTCCACACCTTCAACGCCCTTTA  
 CGAGGCCACAAGCAGATCATCCTCTCCTCCGACCGGCCG 720  
 CCCAAGGACATCCTCACCTTGGAGGCGCGCCTGCGGAGCC  
 GCTTTGAGTGGGGCCTGATCACCGACAATCCAGCCCCCGA  
 CCTGGAAACCCGGATCGCCATCCTGAAGATGAACGCCAGC 840  
 AGCGGGCCTGAGGATCCCGAGGACGCCCTGGAGTACATCG  
 CCCGGCAGGTCACCTCCAACATCCGGGAGTGGGAAGGGGC  
 CCTCATGCGGGCATCGCCTTTCGCCTCCCTCAACGGCGTT 960  
 GAGCTGACCCGCGCCGTGGCGGCCAAGGCTCTCCGACATC  
 TTCGCCCCAGGGAGCTGGAGGCGGACCCCTTGGAGATCAT  
 CCGCAAAGCGGCGGGACCAGTTCGGCCTGAAACCCCGGGA 1080  
 GGAGCTCACGGGGAGCGCCGCAAGAAGGAGGTGGTCCTCC  
 CCCGGCAGCTCGCCATGTACCTGGTGCGGGAGCTCACCCC  
 GGCCTCCCTGCCCCGAGATCGACCAGCTCAACGACGACCGG 1200  
 GACCACACCACGGTCCTCTACGCCATCCAGAAGGTCCAGG  
 AGCTCGCGGAAAGCGACCGGGAGGTGCAGGGCCTCCTCCG  
 CACCCTCCGGGAGGCGTGCACATGA

FIG.20A

VSHEAVWQHVL EHIRRSITEVEFHTWFERIRPLGIRDGVL  
ELAVPTS FALDWIRRH YAGLIQEGPRL LGAQAPRFELRVV  
PGVVQEDIFQPPSPPAQAQPEDTFKTSWWGPTTPWPHG 120  
GAVAVAESPGRAYNPLFIYGGRGLGKTYLMHAVGPLRAKR  
FPHMRLEYVSTETFTNELINRPSARDRMTEFRERYRSVDL  
LLVDDVQFIAGKERTQEEFFHTFNALYEAHKQIILSSDRP 240  
PKDILTLEARLRSRFEWGLITDNPAPDLETRIAILKMNAS  
SGPEDPEDALEYIARQVTSNIREWEGALMRASPFASLNGV  
ELTRA VAAKALRHLRPRELEADPLEIIRKAAGPVRPETPG 360  
GAHGERRKKEVVLPRQLAMYL VRELTPASLPEIDQLNDDR  
DHTTVLYA IQKVQELAESDREVQGLLRTLREACT

FIG.20B

ATGAACATAACGGTTCCCAAAAACTCCTCTCGGACCAGC	40
TTTCCCTCCTGGAGCGCATCGTCCCCTCTAGAAGCGCCAA	
CCCCCTCTACACCTACCTGGGGCTTTACGCCGAGGAAGGG	120
GCCTTGATCCTCTTCGGGACCAACGGGGAGGTGGACCTCG	
AGGTCCGCCTCCCCGCCGAGGCCCAAAGCCTTCCCCGGGT	200
GCTCGTCCCCGCCAGCCCTTCTTCCAGCTGGTGCGGAGC	
CTTCCTGGGGACCTCGTGGCCCTCGGCCTCGCCTCGGAGC	280
CGGGCCAGGGGGGGCAGCTGGAGCTCTCCTCCGGGCGTTT	
CCGCACCCGGCTCAGCCTGGCCCCCTGCCGAGGGCTACCCC	360
GAGCTTCTGGTGCCCCGAGGGGGAGGACAAGGGGGCCTTCC	
CCCTCCGGACGCGGATGCCCTCCGGGGAGCTCGTCAAGGC	440
CTTGACCCACGTGCGCTACGCCGCGAGCAACGAGGAGTAC	
CGGGCCATCTTCCGCGGGGTGCAGCTGGAGTTCTCCCCCC	520
AGGGCTTCCGGGCGGTGGCCTCCGACGGGTACCGCCTCGC	
CCTCTACGACCTGCCCCCTGCCCCAAGGGTTCCAGGCCAAG	600
GCCGTGGTCCCCGCCCGGAGCGTGGACGAGATGGTGCGGG	
TCCTGAAGGGGGCGGACGGGGCCGAGGCCGTCCTCGCCCT	680
GGGCGAGGGGGTGTTGGCCCTGGCCCTCGAGGGCGGAAGC	
GGGGTCCGGATGGCCCTCCGCCTCATGGAAGGGGAGTTCC	760
CCGACTACCAGAGGGTCATCCCCCAGGAGTTCGCCCTCAA	
GGTCCAGGTGGAGGGGGAGGCCCTCAGGGAGGCGGTGCGC	840
CGGGTGAGCGTCCTCTCCGACCGGCAGAACCACCGGGTGG	
ACCTCCTTTTGGAGGAAGGCCCGGATCCTCCTCTCCGCCGA	920
GGGGGACTACGGCAAGGGGCAGGAGGAGGTGCCCGCCCAG	
GTGGAGGGGGCCGGACATGGCCGTGGCCTACAACGCCCCGCT	1000
ACCTCCTCGAGGCCCTCGCCCCCGTGGGGGACCGGGCCCA	
CCTGGGCATCTCCGGGCCACGAGCCCGAGCCTCATCTGG	1080
GGGGACGGGGAGGGGTACCGGGCGGTGGTGGTGCCCCCTCA	
GGGTCTAG	1128

FIG.21A

MNITVPPKKLLSDQLSLLERIVPSRSANPLYTYLGLYAEEG 40  
ALILFGTNGEVDLEVRLPAEAQSLPRVLVPAQPFFQLVRS  
LPGDLVALGLASEPGQGGQLELSSGRFRTRLAPAEGLYP 120  
- ELLVPEGEDKGAFPLRTRMPSEGELVKALTHVRYAASNEEY  
RAIFRGVQLEFSPOGFRAVASDGYRLALYDLPLPQGFQAK 200  
AVVPARSVDEMVRVLKGADGAEAVLALGEGVLALALEGGS  
GVRMALRLMEGEFPDYQRVIPQEFALKVQVEGEALREAVR 280  
RVSVLSDRQNHRVDLLLEEGRILLSAEGDYGKGQEEVPAQ  
VEGPDMAVAYNARYLLEALAPVGDRHLGISGPTSPSLIW 360  
GDGEGYRAVVVPLRVZ

FIG.21B

T. th. beta	MNITVPKLLSDQLSLLERIVPSRSANPLYTYLGLYAEEGALILFGTNGEVDLEVRLPAE
E. coli. bet	MKFTVEREHLKPLQOVSGPLGGRPTLPILGNLLQVADGTLSTGTDLEMEMVARVALV
P. mirab. be	MKFIIEREQLKPLQOVSGPLGGRPTLPILGNLLKVTENTLSLGTDLMEMMARVSL
H. infl. bet	MQFSISRENILKPLQOVCGVLSNRPNIPVANNVLLQIEDYRLTITGTDLLEVELSSQTQLS
P. put. beta	MHFTIQREALKPLQLVAGVVERRQTLPVLSNVLLVVQQQLSLGTDLLEVELVGRVQLE
B. cap. beta	MKFTIQNDILTKNLKKITRVLVKNISFPILLENILIQVEDGTLSTTTNLEIELISKIEII
	* . . . * . . . * . . . * . . . *
T. th. beta	AQSLP-RVLPAPQFFQLVRSPLPGDLVALGLASEPGQGQLELSSGRFTRLSLAPAEGY
E. coli. bet	QPHEPGATTVPARKFFDICRGLP-EGAEIAVQLE---GERMLVRSGRSRFSLSTLPAADF
P. mirab. be	QSHEIGATTVPARKFFDIWRGLP-EGAEISVELD---GDRLLVRSGRSRFSLSTLPASDF
H. infl. bet	SSSENGTFTIPAKKFLDICRTLS-DDSEITVTFE---QDRALVQSGRSRFTLATQPAEEY
P. put. beta	EPAEPGEITVPARKIMDICKSLP-NDALIDIKVD---EQKLLVKAGRSRFTLSTLPANDE
B. cap. beta	TKYIPGKTTISGRKILNICRTLS-EKSIKIMQLK---NKKMYISSENSNYILSTLSADTF
	* . . . * . . . * . . . * . . . *
T. th. beta	PELLVPEGEDKGAFPLRTRMPSGELVKALTHVRYAASNEEYRAIFRGVQLEFSPOGFRAV
E. coli. bet	PNLDD---WQSEVEFTLPQAT-----MKRLIEATQFSMAHQDVRYYLNGMLFETEGEELRTV
P. mirab. be	PNLDD---WQSEVEFTLPQAT-----LKRLIESTQFSMAHQDVRYYLNGMLFETENTELRTV
H. infl. bet	PNLTD---WQSEVDFELPQNT-----LRRLIEATQFSMANQDARYFLNGMKFETEGNLLRTV
P. put. beta	PTVEE---GPGSLTCNLEQSK-----LRRLIERTSFAMAQDVRYYLNGMLLEVSRNTLRAV
B. cap. beta	PNHQN---FDYISKFDISSNI-----LKEMIEKTEFSMGKQDVRYYLNGMLLEKKDKFLRSV
	* . . . * . . . * . . . * . . . *
T. th. beta	ASDGYRLALYDLPLPQGFQA--KAVVPARSVDEMVRVLKGADGAEAVLALGEGVLALALE
E. coli. bet	ATDGHRLAVCSMPICQSLPS-HSVIVPRKGVIELMRMLDG-GDNPLRVQIGSNNIRAHVG
P. mirab. be	ATDGHRLAVCAMDIGQSLPG-HSVIVPRKGVIELMRLLDGSGESLLQLOIGSNNLRAHVG
H. infl. bet	ATDGHRLAVCTISLEQELQN-HSVILPRKGVLELVRLEET-NDEPARLQIGTNNLRVHLK
P. put. beta	STDGHRALCMSAPIEQEDRHQVIVPRKGILELARLLTD-PEGMVSIVLGQHHIRATTG
B. cap. beta	ATDGYRLAISYTQLKKDINF-FSIIIPNKAVMELKLKLTNT-QPQLNLLIGSNSIRIYTK
	** *** . . . * . . . * . . . *

FIG. 22A





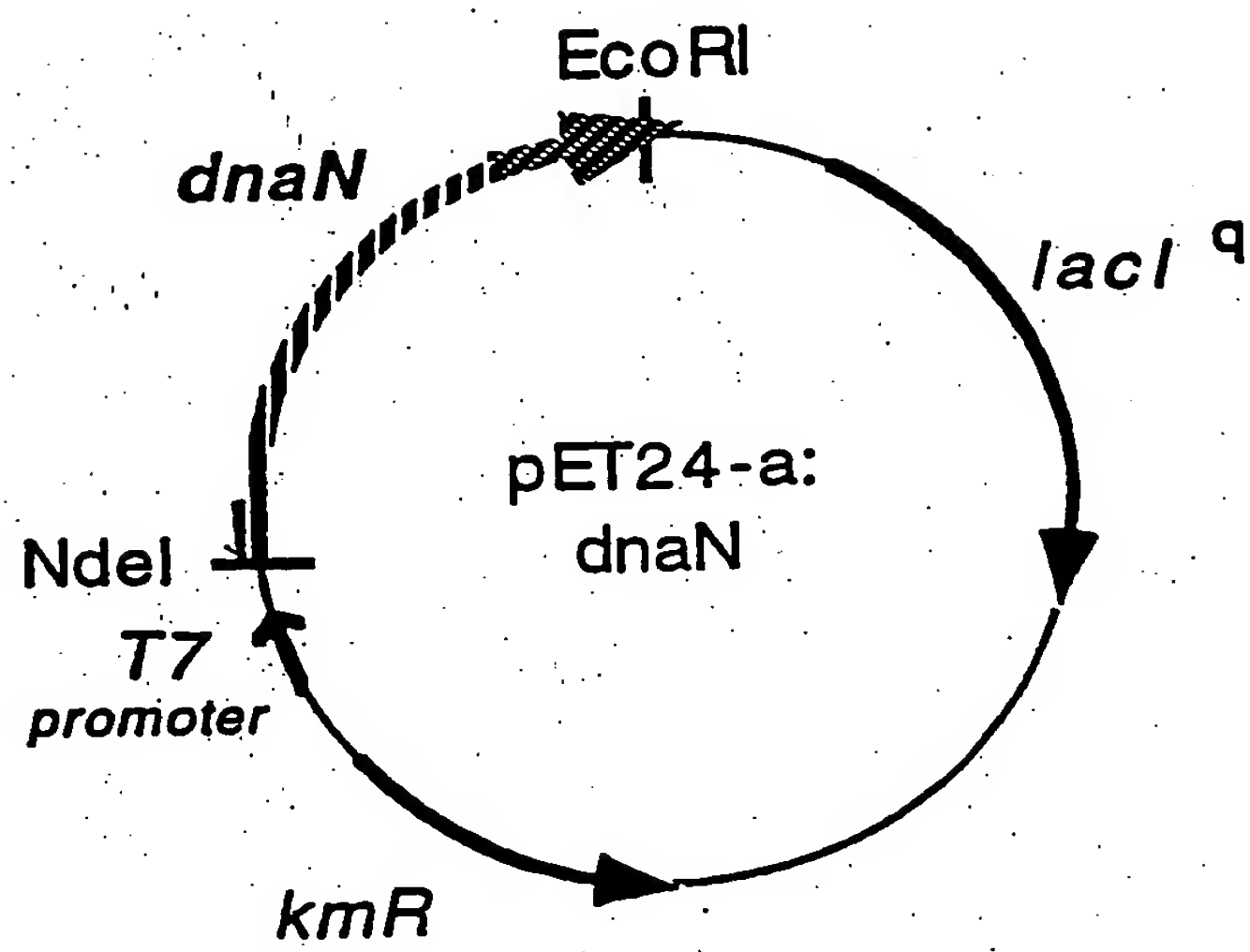
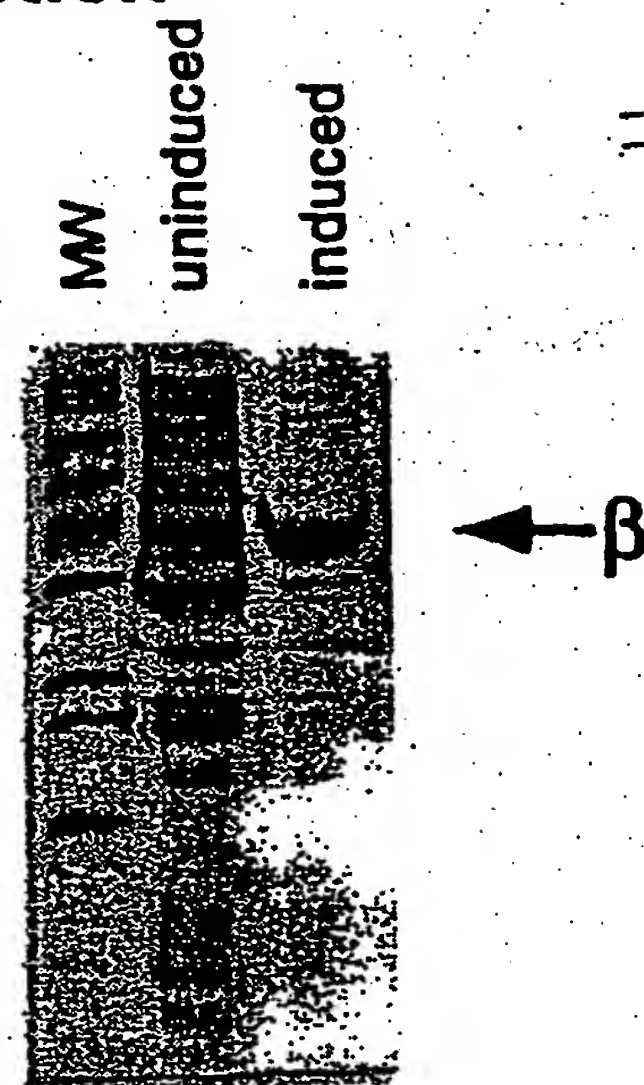


FIG.23

**FIG.24A Induction**



Lysis

Heat Step

**FIG.24B MonoQ Column**

Fraction: 5 7 9 11 13 15 17 19 21 23 25

$\beta$  →

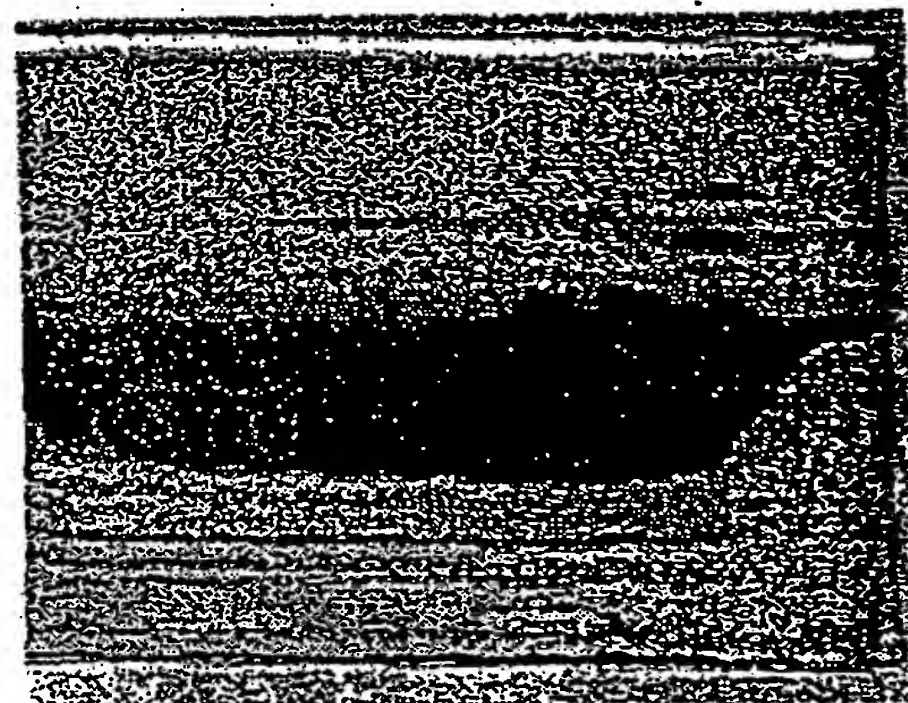


FIG.25A

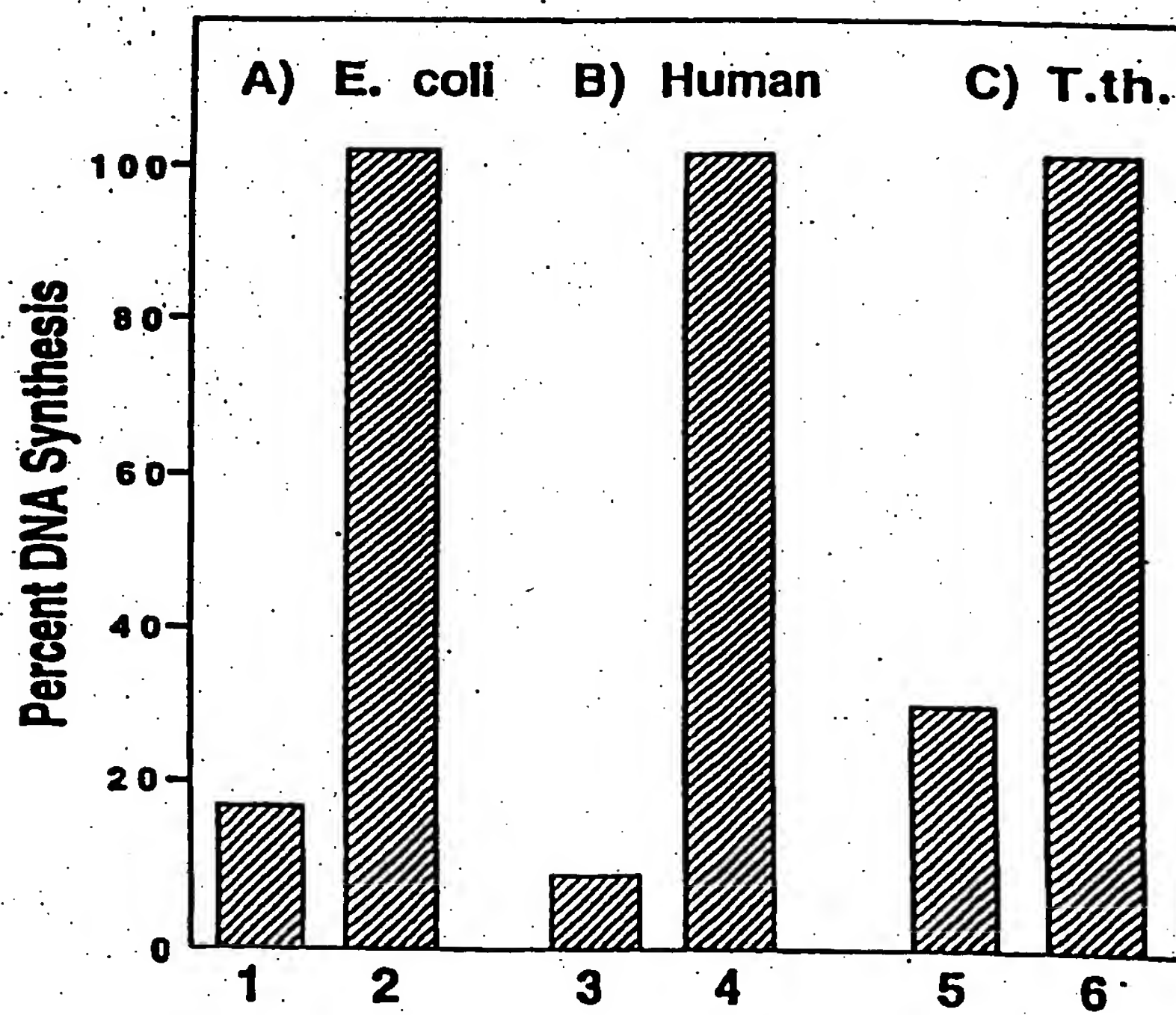
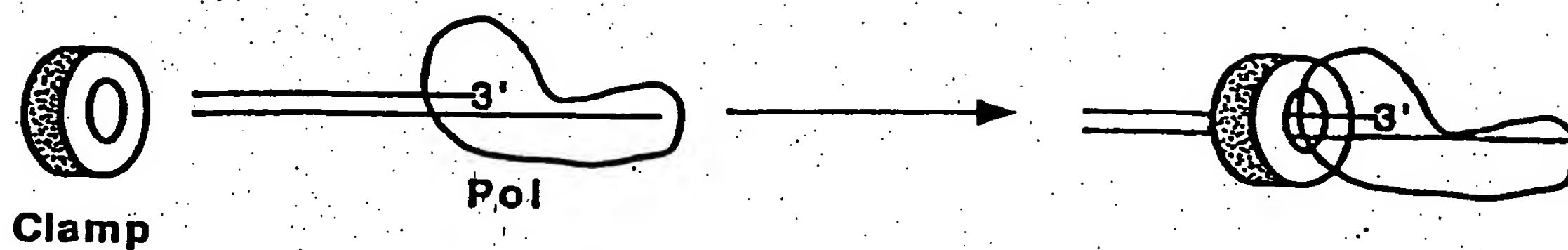


FIG.25B

FIG. 26A

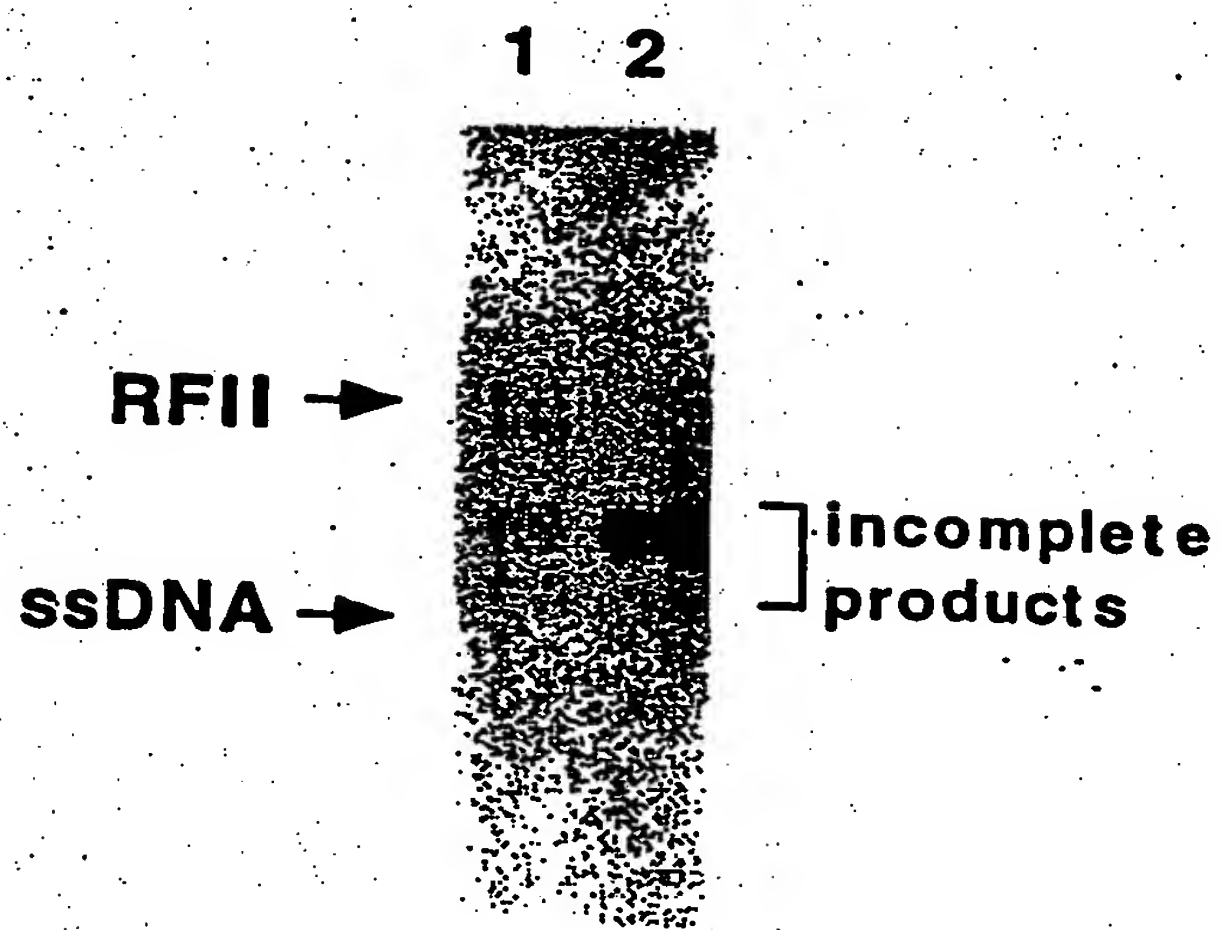
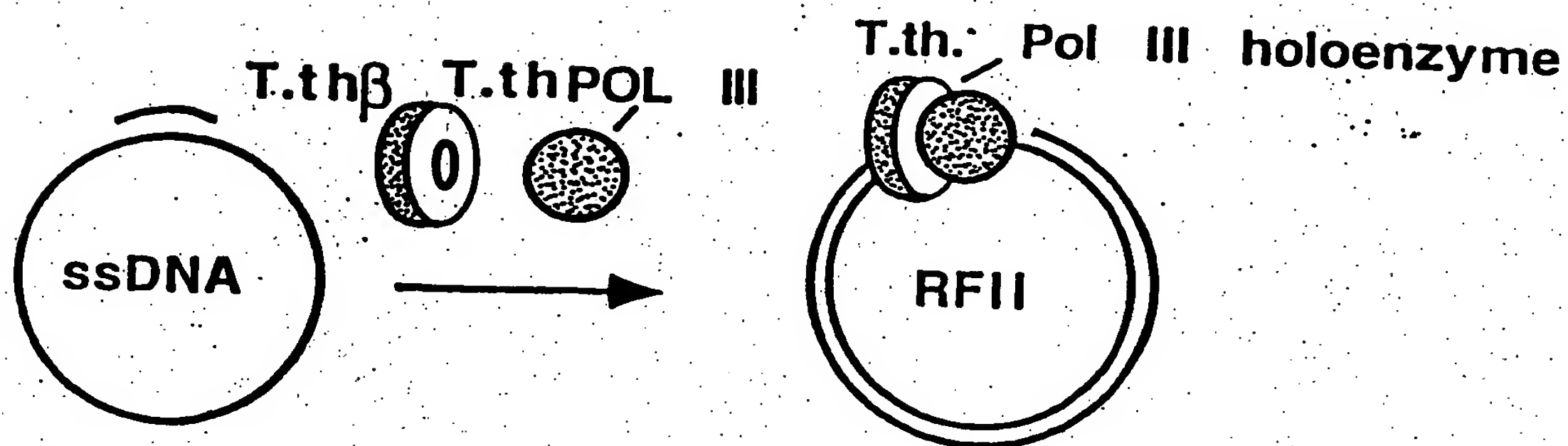


FIG. 26B

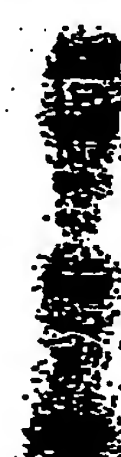
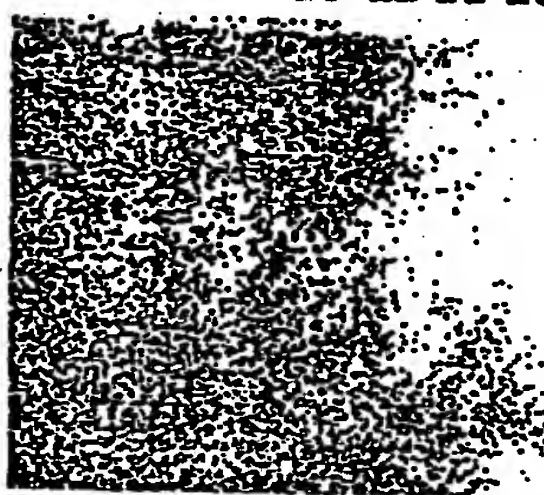


$\alpha$        $\tau$        $\delta$        $\delta'$  SSB  $\epsilon$



FIG. 27

2 4 6 8 10 12 14 16 18 20 22 24 26 28  $\sigma$  30 32 34 36 38 40 42 44 46 48 50 52 54



$\tau$   
 $\sigma$

FIG. 28

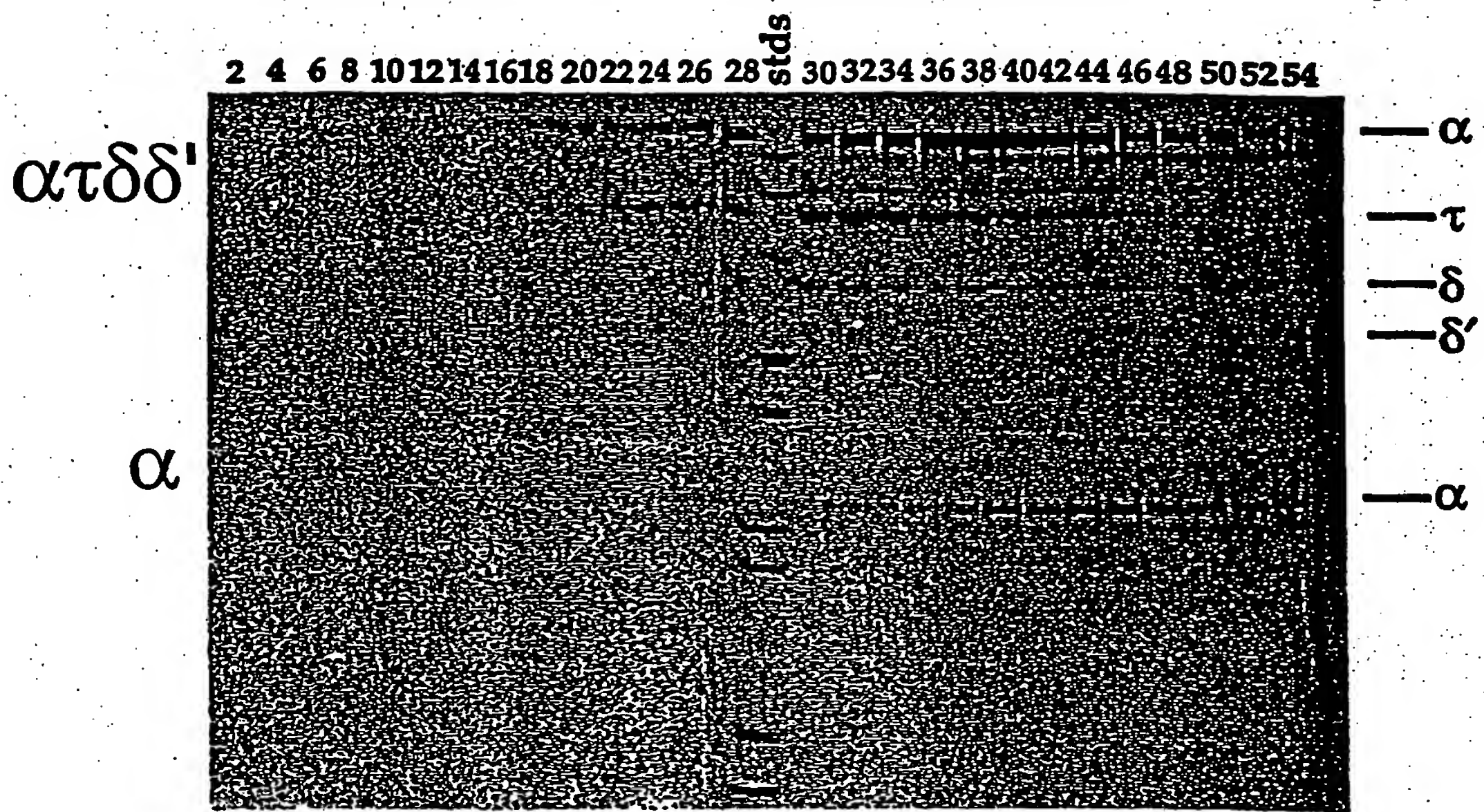


FIG. 29

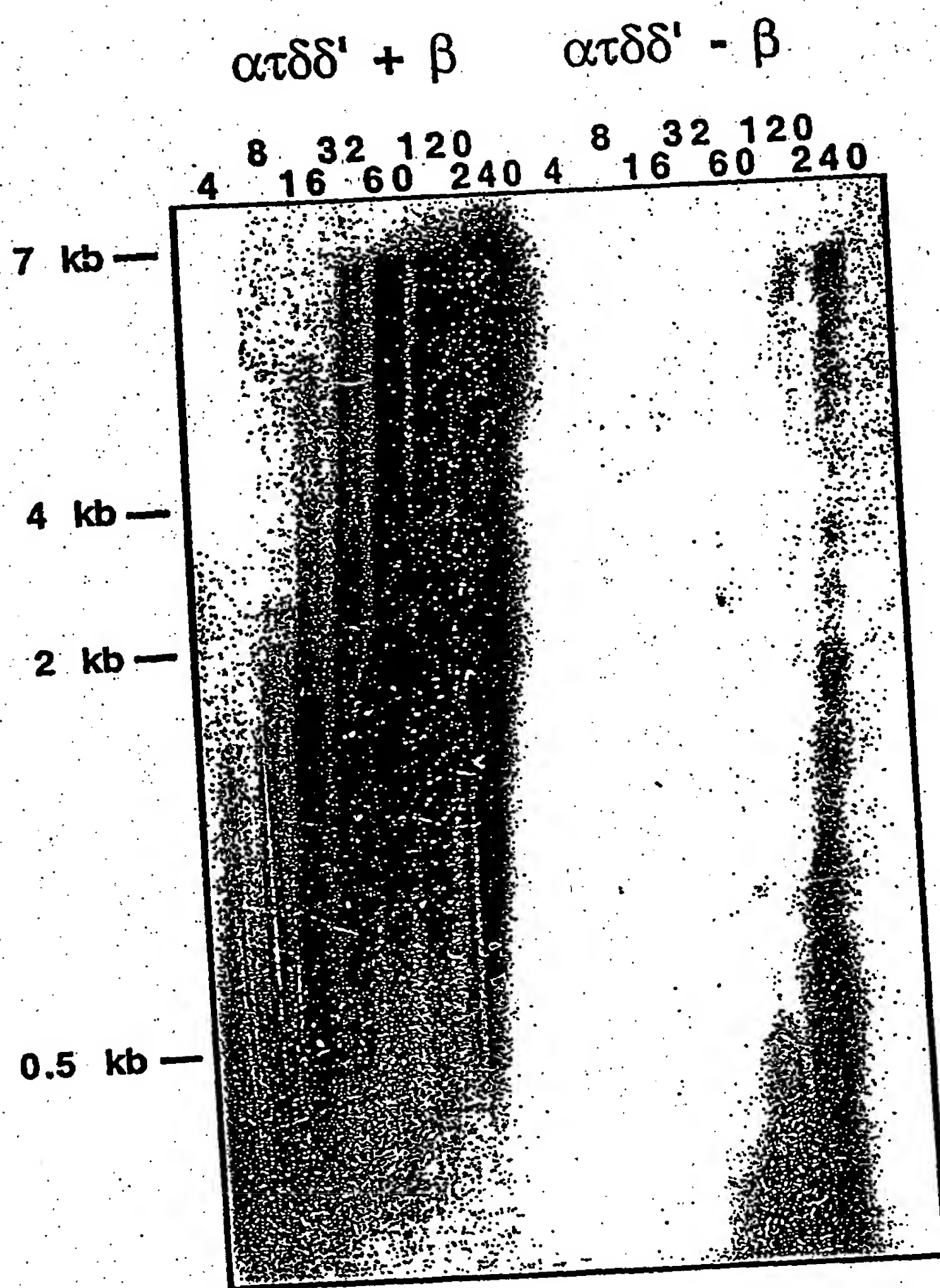
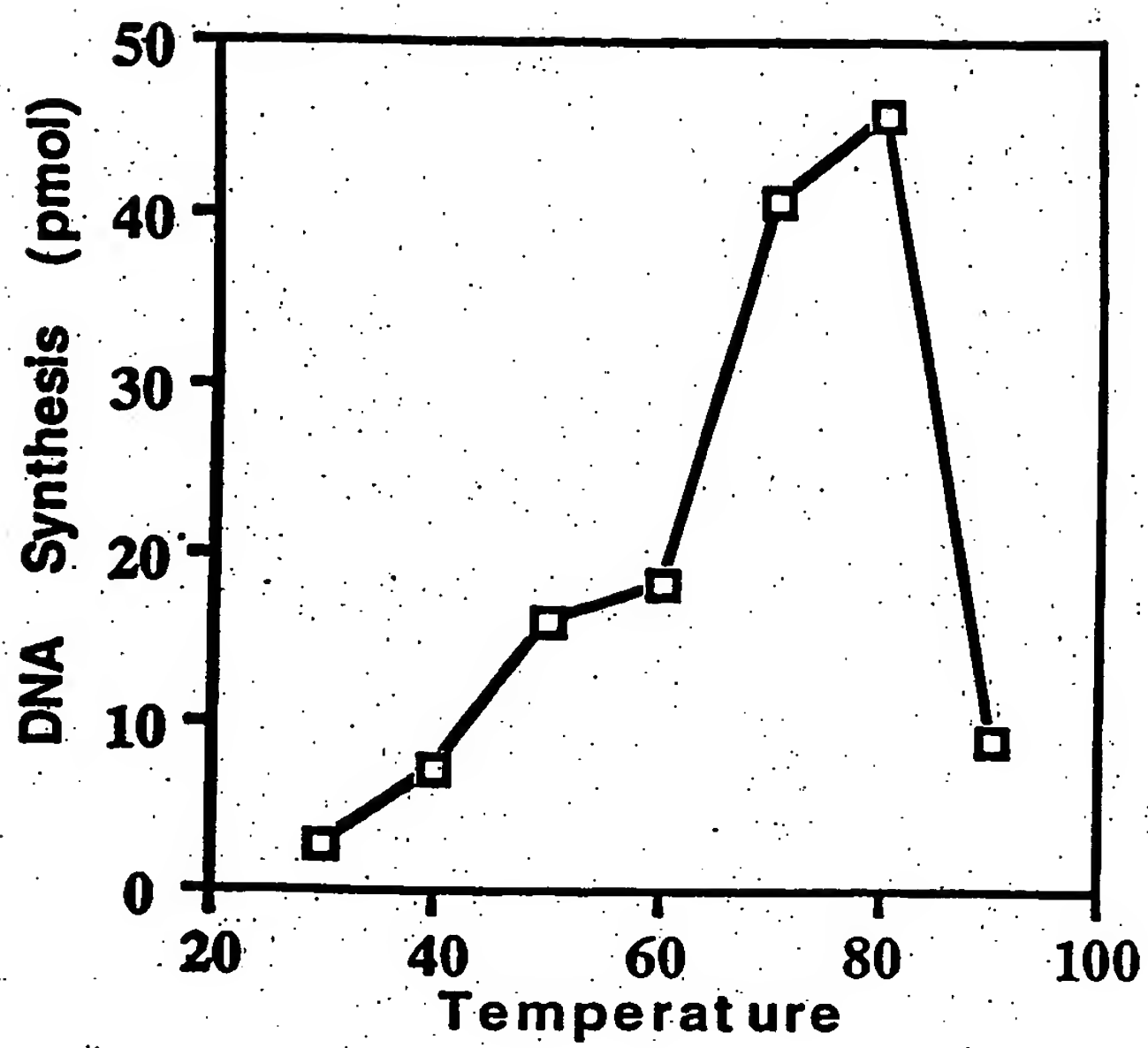
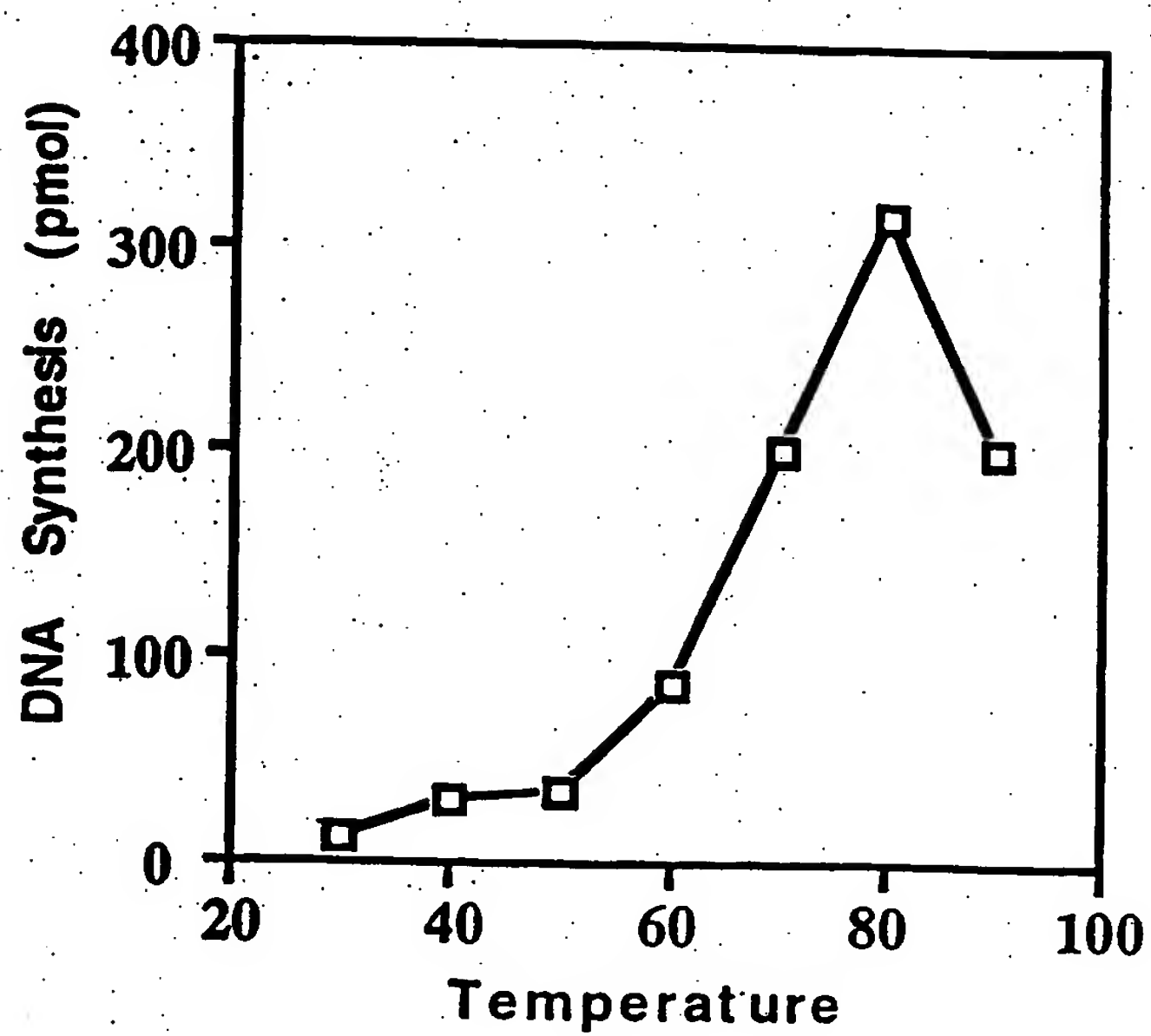


FIG. 30



**FIG. 31**



**FIG. 32**

$\alpha$

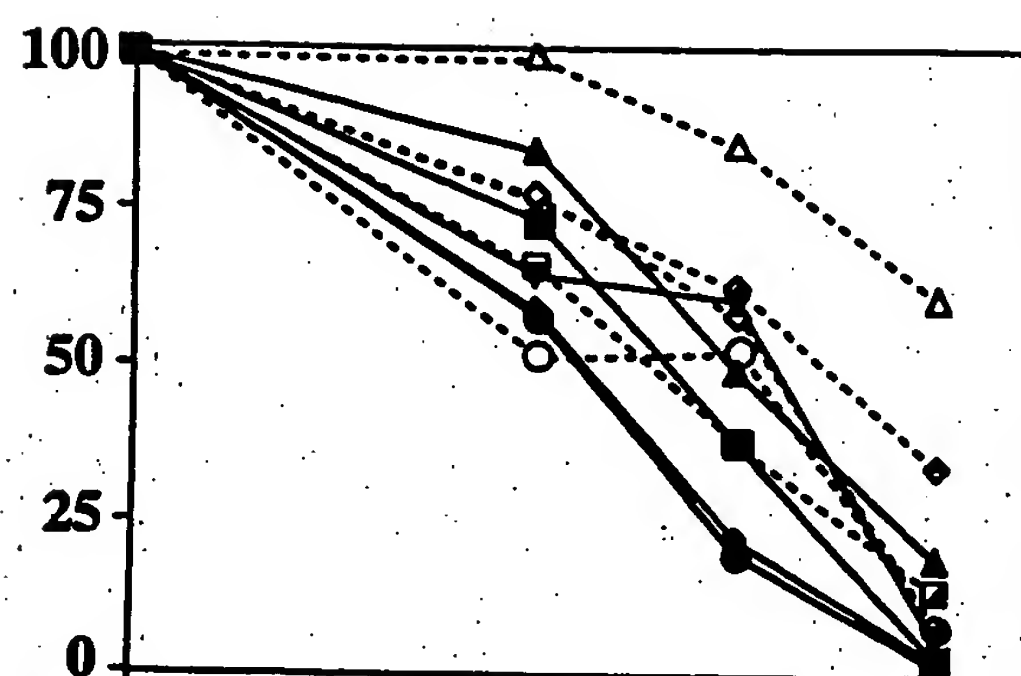


FIG. 33A

$\beta$

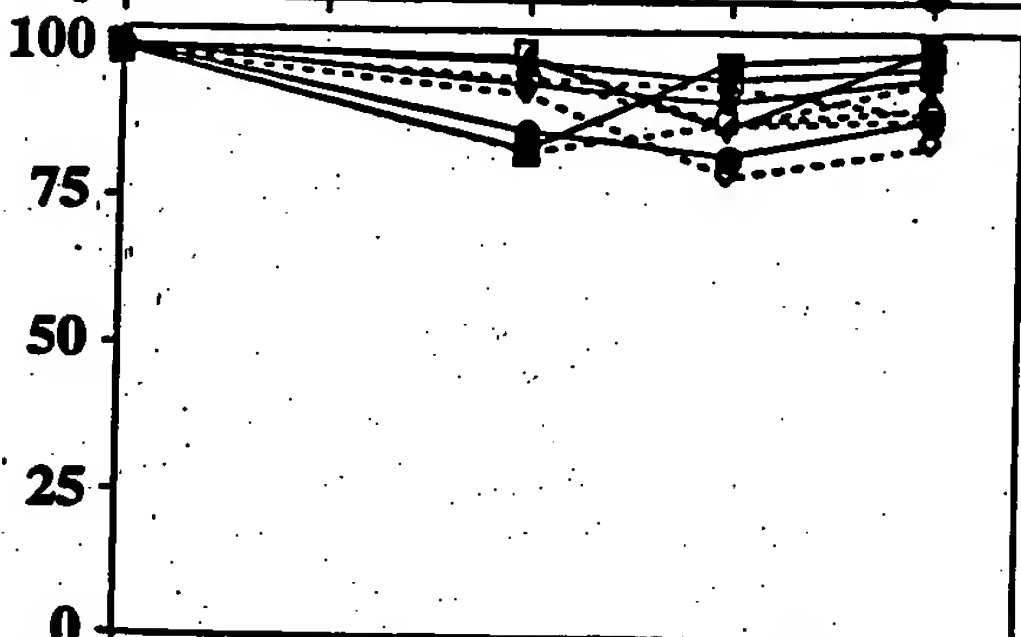


FIG. 33B

$\tau\delta\delta'$

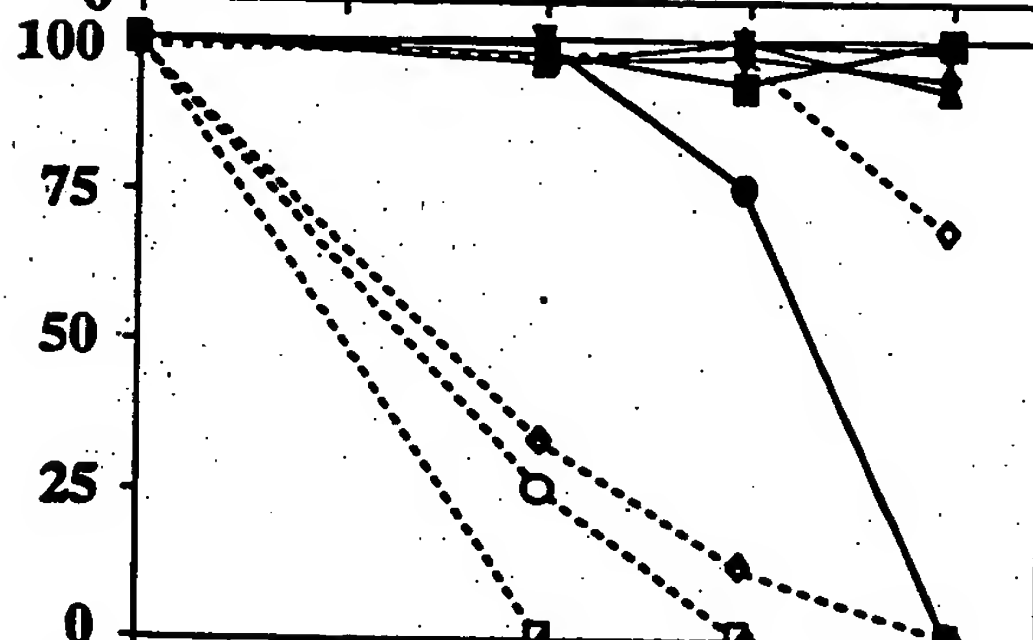


FIG. 33C

SSB

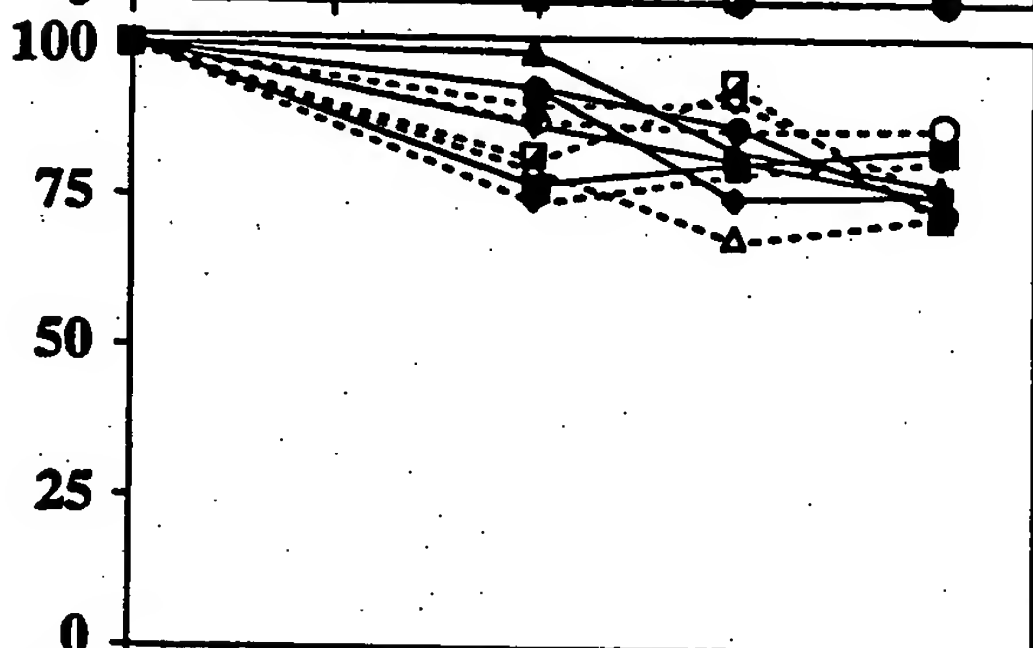


FIG. 33D

Pol III\*

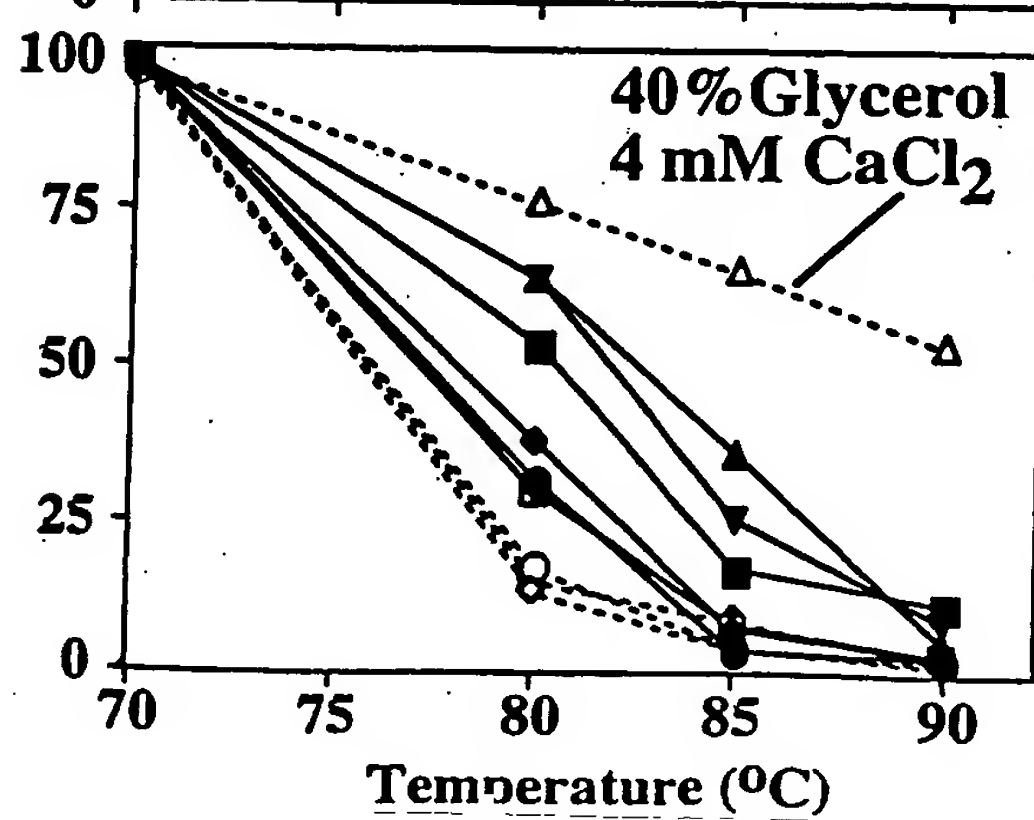


FIG. 33E



ATGAGTAAGGATTTTCGTCCACCTTCACCTGCACACCCAGTTCTCACTCCT	
GGACGGGGCTATAAAGATAGACGAGCTCGTGAAAAAGGCAAAGGAGTATG	100
GATACAAAGCTGTCGGAATGTCAGACCACGGAAACCTCTTCGGTTCGTAT	
AAATTCTACAAAGCCCTGAAGGCGGAAGGAATTAAGCCCATAATCGGCAT	200
GGAAGCCTACTTTTACCACGGGTTCGAGGTTTGACAGAAAGACTAAAACGA	
GCGAGGACAACATAACCGACAAGTACAACCACCACCTCATACTTATAGCA	300
AAGGACGAAAAGGTCTAAAGAACTTAATGAAGCTCTCAACCCTCGCCTAC	
AAAGAAGGTTTTTTACTACAAACCCAGAATTGATTACGAACTCCTTGAAAA	400
GTACGGGGGAGGGCCTAATAGCCCTTACCGCATGCCTGAAAGGTGTTCCCA	
CCTACTACGCTTCTATAAACGAAGTGAAAAAGGCGGAGGAATGGGTAAAG	500
AAGTTCAAGGATATATTCGGAGATGACCTTTATTTAGAACTTCAAGCGAA	
CAACATTCAGAACAGGAAGTGGCAAACAGGAACTTAATAGAGATAGCCA	600
AAAAGTACGATGTGAAACTCATAGCGACGCAGGACGCCCACTACCTCAAT	
CCCGAAGACAGGTACGCCACACGGTTCTTATGGCACTTCAAATGAAAAA	700
GACCATTACGAACTGAGTTCGGGAAACTTCAAGTGTTCAAACGAAGACC	
TTCACTTTGCTCCACCCGAGTACATGTGAAAAAGTTTGAAGGTAAAGTTC	800
GAAGGCTGGGAAAAGGCACTCCTGAACACTCTCGAGGTAATGGAAAAGAC	
AGCGGACAGCTTTGAGATATTTGAAAACCTCCACCTACCTCCTTCCCAAGT	900
ACGACGTTCCGCCCGACAAAACCCCTTGAGGAATACCTCAGAGAACTCGCG	
TACAAAGGTTTAAGACAGAGGATAGAAAGGGGACAAGCTAAGGATACTAA	1000
AGAGTACTGGGAGAGGCTCGAGTACGAACTGGAAGTTATAAACAAAATGG	
GCTTTGCGGGATACTTCTTGATAGTTCAGGACTTCATAAACTGGGCTAAG	1100
AAAAACGACATACCTGTTGGACCCGGAAGGGGAAGTGCTGGAGGTTCCCT	
CGTCGCATACGCCATCGGAATAACGGACGTTGACCCTATAAAGCACGGAT	1200
TCCTTTTTTGAGAGGTTCTTAAACCCCGAAAGGGTTTCCATGCCGGATATA	
GACGTGGATTTCTGTCAGGACAACAGGGAAAAGGTCATAGAGTACGTAAG	1300
GAACAAGTACGGACACGACAACGTAGCTCAGATAATCACCTACAACGTAA	
TGAAGGCGAAGCAAACACTGAGAGACGTCGCAAGGGCCATGGGACTCCCC	1400
TACTCCACCGCGGACAAACTCGCAAAACTCATTCCTCAGGGGGACGTTCA	
GGGAACGTGGCTCAGTCTGGAAGAGATGTACAAAACGCCTGTGGAGGAAC	1500
TCCTTCAGAAGTACGGAGAACACAGAACGGACATAGAGGACAACGTAAAG	
AAGTTCAGACAGATATGCGAAGAAAGTCCGGAGATAAAACAGCTCGTTGA	1600
GACGGCCCTGAAGCTTGAAGGTCTCACGAGACACACCTCCCTCCACGCCG	
CGGGAGTGGTTATAGCACCAAAGCCCTTGAGCGAGCTCGTTCCCCTCTAC	1700
TACGATAAAGAGGGCGAAGTCGCAACCCAGTACGACATGGTTTCAGCTCGA	
AGAACTCGGTCTCCTGAAGATGGACTTCCTCGGACTCAAACCCCTCACAG	1800
AACTGAAACTCATGAAAGAACTCATAAAGGAAAGACACGGAGTGGATATA	
AACTTCCTTGAACCTTCCCCTTGACGACCCGAAAGTTTACAAACTCCTTCA	1900
GGAAGGAAAAACCACGGGAGTGTTCCAGCTCGAAAGCAGGGGGAATGAAAG	
AACTCCTGAAGAAACTAAAGCCCGACAGCTTTGACGACATCGTTGCGGTC	2000
CTCGCACTCTACAGACCCGGACCTCTAAAGAGCGGACTCGTTGACACATA	
CATTAAGAGAAAGCACGGAAAAGAACCCGTTGAGTACCCCTTCCCGGAGC	2100
TTGAACCCGTCCTTAAGGAAACCTACGGAGTAATCGTTTATCAGGAACAG	
GTGATGAAGATGTCTCAGATACTTTCCGGCTTTACTCCCGGAGAGGCGGA	2200
TACCCTCAGAAAGGCGATAGGTAAGAAGAAAGCGGATTTAATGGCTCAGA	
TGAAAGACAAGTTCATACAGGGAGCGGTGGAAAGGGGATACCCTGAAGAA	2300
AAGATAAGGAAGCTCTGGGAAGACATAGAGAAGTTCGCTTCCTACTCCTT	
CAACAAGTCTCACTCGGTAGCTTACGGGTACATCTCCTACTGGACCGCCT	2400

FIG. 34A

ACGTTAAAGCCC	ACTATCCC	GCGGAGTTCTTCGCGGTAA	AACTCACA	ACT	
GAAAAGAACGACAACAAGTTCCTCAACCTCATAAAAGACGCTAA	ACTCTT				2500
CGGATTTGAGATACTTCCCCCGACATAAACAAGAGTGATGTAGGATTTA					
CGATAGAAGGTGAAAACAGGATAAGGTT	CGGGCTTGCGAGGATAAAGGGA				2600
GTGGGAGAGGAACTGCTAAGATAATCGTTGAAGCTAGAAAGAAGTATAA					
GCAGTTCAAAGGGCTTGCGGACTTCATAAACAAAACCAAGAACAGGAAGA					2700
TAAACAAGAAAGTCGTGGAAGCACTCGTAAAGGCAGGGGCTTTTGACTTT					
ACTAAGAAAAAGAGGAAAGAACTACTCGCTAAAGTGGCAAACTCTGAAAA					2800
AGCATTAATGGCTACACAAAACCTCCCTTTTCGGTGCACCGAAAGAAGAAG					
TGGAAGAACTCGACCCCTTAAAGCTTGAAAAGGAAGTTCTCGGTTTTAC					2900
ATTCAGGGCACCCCTTGACAACCTACGAAAAGCTCCTCAAGAACCGCTA					
CACACCCATTGAAGATTTAGAAGAGTGGGACAAGGAAAGCGAAGCGGTGC					3000
TTACAGGAGTTATCACGGAACCTCAAAGTAAAAAAGACGAAAAACGGAGAT					
TACATGGCGGTCTTCAACCTCGTTGACAAGACGGGACTAATAGAGTGTGT					3100
CGTCTTCCCGGGAGTTTACGAAGAGGGCAAAGGAACTGATAGAAGAGGACA					
GAGTAGTGGTAGTCAAAGGTTTTCTGGACGAGGACCTTGAAACGGAAAAT					3200
GTCAAGTTCGTGGTGAAAGAGGTTTTCTCCCCTGAGGAGTTCGCAAAGGA					
GATGAGGAATACCCTTTATATATTCTTAAAAAGAGAGCAAGCCCTAAACG					3300
GCGTTGCCGAAAACTAAAGGGAATTATTGAAAACAACAGGACGGAGGAC					
GGATACAACCTTGGTTCTCACGGTTGATCTGGGAGACTACTTCGTTGATTT					3400
AGCACTCCCACAAGATATGAACTAAAGGCTGACAGAAAGGTTGTAGAGG					
AGATAGAAAACTGGGAGTGAAGGTCATAATTTAGTAAATAACCCTTACT					3500
TCCGAGTAGTCCCC					

**FIG. 34B**

MSKDFVHLHLHTQFSLLDGAIKIDELVKKAKEYGYKAVGMSDHGNLFGSY	
KFYKALKAEGIKPIIGMEAYFTTGSRFDRKTKTSEDNITDKYNHHLILIA	100
KDDKGLKNLMKLSTLAYKEGFYKPRIDYELLEKYGEGLIALTACLKGV	
TYYASINEVKKAEEWVKKFKDIFGDDLYLELQANNIPEQEVANRNLIEIA	200
KKYDVKLIATQDAHYLNPEDRYAHTVLMALQMKKTIHELSSGNFKCSNED	
LHFAPPEYMWKKFEGKFEGWEKALLNTLEVMEKTADSFEIFENSTYLLPK	300
YDVPPDKTLEEYLRELAYKGLRQRIERGQAKDTKEYWERLEYELEVINKM	
GFAGYFLIVQDFINWAKKNDIPVGPGRGSAGGSLVAYAIGITDVPDIKHG	400
FLFERFLNPERVSMPDIDVDFCQDNREKVIEWVRNKYGHDNVAQIITYNV	
MKAKQTLRDVARAMGLPYSTADKLAKLIPOGDVQGTWLSLEEMYKTPVEE	500
LLQKYGEHRTDIEDNVKKFRQICEESPEIKQLVETALKLEGLTRHTSLHA	
AGVVIAPKPLSELVPLYDYDKEGEVATQYDMVQLEELGLLKMDFLGLKTLT	600
ELKLMKELIKERHGVDINFLELPLDDPKVYKLLQEGKTTGVFQLESRGMK	
ELLKKLKPDSFDDIVAVLALYRPGPLKSGLDVTYIKRKHGKEPVEYPPFE	700
LEPVLKETYGIVIVYQEQVMKMSQILSGFTPGEADTLRKAIGKKKADLMAQ	
MKDKFIQGAVERGYPEEKIRKLWEDIEKFASYSFNKSHSVAYGYISYWTA	800
YVKAHYPAEFFAVKLTTEKNDNKFLNLIKDAKLFGFEILPPDINKSDVGF	
TIEGENRIRFGLARIKGVGEETAKIIVEARKKYKQFKGLADFINKTKNRK	900
INKKVVEALVKAGAFDFTKKRKELLAKVANSEKALMATQNSLFGAPKEE	
VEELDPLKLEKEVLGFYISGHPLDNYEKLLKNRYTPIEDLEEDWKESEAV	1000
LTGVITELKVKKTNGDYMAVFNLVDKTGLIECVVFPGVYEEAKELIEED	
RVVVVKGFLDEDLETENVKFVVEVFSPEEFAKEMRNTLYIFLKREQALN	1100
GVAEKLKGIENNRTEDGYNLVLTVDLGDFVDLALPQDMKLKADRKVVE	
EIEKLGVKVII	1161

FIG. 35

ATGAACTACGTTCCCTTCGCGAGAAAGTACAGACCGAAATTCTTCAGGGA	
AGTAATAGGACAGGAAGCTCCCGTAAGGATACTCAAAAACGCTATAAAAA	100
ACGACAGAGTGGCTCACGCCTACCTCTTTGCCGGACCGAGGGGGGTGGG	
AAGACGACTATTGCAAGAATTCTCGCAAAAGCTTTGAACTGTAAAAATCC	200
CTCCAAAGGTGAGCCCTGCGGTGAGTGCGAAAACTGCAGGGAGATAGACA	
GGGGTGTGTTCCCTGACTTAATTGAAATGGATGCCGCCTCAAACAGGGGT	300
ATAGACGACGTAAGGGCATTAAAAGAAGCGGTCAATTACAAACCTATAAA	
AGGAAAGTACAAGGTTTACATAATAGACGAAGCTCACATGCTCACGAAAG	400
AAGCTTTCAACGCTCTCTTAAAAACCCTCGAAGAGCCCCCTCCCAGAACT	
GTTTTTCGTCCTTTGTACCACGGAGTACGACAAAATTCTTCCCACGATACT	500
CTCAAGGTGTCAGAGGATAATCTTCTCAAAGGTAAGAAAGGAAAAAGTAA	
TAGAGTATCTAAAAAAGATATGTGAAAAGGAAGGGATTGAGTGCGAAGAG	600
GGAGCCCTTGAGGTTCTGGCTCATGCCTCTGAAGGGTGTCATGAGGGATGC	
AGCCTCTCTCCTGGACCAGGCGAGCGTTTACGGGGAAGGCAGGGTAACAA	700
AAGAAGTAGTGGAGAACTTCCTCGGAATTCTCAGTCAGGAAAGCGTTAGG	
AGTTTTCTGAAATTGCTTCTGAACTCAGAAGTGGACGAAGCTATAAAGTT	800
CCTCAGAGAACTCTCAGAAAAGGGCTACAACCTGACCAAGTTTTTGGGAGA	
TGTTAGAAGAGGAAGTGAGAAACGCAATTTTAGTAAAGAGCCTGAAAAAT	900
CCCGAAAGCGTGGTTCAGAACTGGCAGGATTACGAAGACTTCAAAGACTA	
CCCTCTGGAAGCCCTCCTCTACGTTGAGAACCTGATAAACAGGGGTAAAG	1000
TTGAAGCGAGAACGAGAGAACCTTAAGAGCCTTTGAACTCGCGGTAATA	
AAGAGCCTTATAGTCAAAGACATAATTCCCGTATCCCAGCTCGGAAGTGT	1100
GGTAAAGGAAACCAAAAAGGAAGAAAAGAAAGTTGAAGTAAAAGAAGAGC	
CAAAAGTAAAAGAAGAAAAACCAAGGAGCAGGAAGAGGACAGGTTCCAG	1200
AAAGTTTTTAAACGCTGTGGACGGCAAAATCCTTAAAAGAATACTTGAAGG	
GGCAAAAAGGGAAGAAAGAGACGGAAAAATCGTCCTAAAGATAGAAGCCT	1300
CTTATCTGAGAACCATGAAAAAGGAATTTGACTCACTAAAGGAGACTTTT	
CCTTTTTTTAGAGTTTGAACCCGTGGAGGATAAAAAAAACCTCAGAAGTC	1400
CAGCGGGACGAGGCTGTTTTTAAAGGTAAAGGAGCTCTTCAATGCAAAAAT	
ACTCAAAGTACGAAGTAAAAGCTAAGGTCATAAAGGTGAGAATGCCCGTG	1500
GAAGAGATAGGGCTGTTTAACGCCTAATAGACGGCTTGCCCAGGTACGC	
ACTCACGAGGACGAAGGAAAAGGGAAAGGGAGAAGTTTTTCGTTTTAGCGA	1600
CTCCTTATAAAGTCAAGGAATTGATGGAAGCTATGGAGGGTATGAAAAAA	
CACATAAAGGATTTAGAAATCCTCGGAGAGACGGATGAGGATTTAACTTT	1700
TTAAAGTATGGGTGTATCTGAGCAAAGGTTTAAGCTAAAAACAAACCTGA	
AACCCGCAGGGGACCAGCCGAAAGCCATAAAAAAACTCCTTGAAAACCTA	1800
AGGAAAGGCGTAAAAGAACAACACTTCTCGGAGTCACGGGAAGCGGAAA	
GACTTTTACTCTAGCAAACGTAATAGCGAAGTACAACAAACCAACTCTTG	1900
TGGTAGTTCACAACAAAATTCTCGCGGCACAGCTATACAGGGAGTTTAAA	
GAACTATTCCTTGAAAACGCTGTAGAGTACTTTGTCTCTTACTACGACTA	2000
TTACCAACCTGAAGCCTACATTCCCGAAAAAGATTTATACATAGAAAAGG	
ACGCGAGTATAAACGAAAGCTGGAACGTTTCAGACACTCCGCCACGATAT	2100
CCGTTCTAGAAAGGAGGGACGTTATAGTAGTTGCTTCAGTTTCTTGCCATA	
TACGGACTCGGGAAACCTGAGCACTACGAAAACCTGAGGATAAAACTCCA	2200
AAGGGGAATAAGACTGAACTTGAGTAAGCTCCTGAGGAAACTCGTTGAGC	
TAGGATATCAGAGAAATGACTTTGCCATAAAGAGGGCTACCTTCTCGGTT	2300
AGGGGAGACGTGGTTGAGATAGTCCCTTCTCACACGGAAGATTACCTCGT	
GAGGGTAGAGTTCTGGGACGACGAAGTTGAAAGAATAGTCCTCATGGACG	2400
CTCTGAAC	

FIG. 36



MNYVPFARKYRPFREVIQGEAPVRILKNAIKNDRVAHAYLFAGPRGVG	
KTTIARILAKALNCKNPSKGEPCECENCREIDRGVFPDLIEMDAASNRG	100
IDDVRALKEAVNYKPIKGKYKVYIIDEAHMLTKEAFNALLKTLEPPPT	
VFVLCTTEYDKILPTILSRCQRIIFSKVRKEKVIEYLKKICEKEGIECEE	200
GALEVLAHASEGCMRDAASLLDQASVYGEGRVTKEVVENFLGILSQESVR	
SFLKLLLNSEVDEAIKFLRELSEKGYNLTKFWEMLEEEVRNAILVKSLKN	300
PESVVQNWQDYEDFKDYPLEALLYVENLINRGKVEARTREPLRAFELAVI	
KSLIVKDIIPVSQLGSVVKETKKEKKVEVKEEPKVKEEKPKQEEDRFQ	400
KVLNAVDGKILKRILEGAKREERDGKIVLKIEASYLRTMKKEFDSLKETF	
PFLEFEPVEDKKKPQKSSGTRLF	473

**FIG. 37**



ATGCGCGTTAAGGTGGACAGGGAGGAGCTTGAAGAGGTTCTTAAAAAAGC	
AAGAGAAAGCACGGAAAAAAAGCCGCACTCCCGATACTCGCGAACTTCT	100
TACTCTCCGCAAAAGAGGAAAACTTAATCGTAAGGGCAACGGACTTGGAA	
AACTACCTTGTAGTCTCCGTAAAGGGGGAGGTTGAAGAGGAAGGAGAGGT	200
TTGCGTCCACTCTCAAAAACCTCTACGATATAGTCAAGAACTTAAATTCCG	
CTTACGTTTACCTTCATACGGAAGGTGAAAAACTCGTCATAACGGGAGGA	300
AAGAGTACGTACAAACTTCCGACAGCTCCCGCGGAGGACTTTCCCGAATT	
TCCAGAAATCGTAGAAGGAGGAGAAACACTTTCGGGAAACCTTCTCGTTA	400
ACGGAATAGAAAAGGTAGAGTACGCCATAGCGAAGGAAGAAGCGAACATA	
GCCCTTCAGGGAATGTATCTGAGAGGATACGAGGACAGAATTCACTTTGT	500
GTTCCGGACGGTCAACAGGCTTGCACTTTATGAACCTCTACGTAAACATTGA	
AAAGAGTGAAGACGAGTCTTTTGCTTACTTCTCCACTCCCGAGTGGAAC	600
TCGCCGTTAGCTCCTGGAAGGAGAATTCCCGGACTACATGAGTGTCATCC	
CTGAGGAGTTTTTCGGCGGAAGTCTTGTTTGAGACAGAGGAAGTCTTAAAG	700
GTTTTAAAGAGGTTGAAGGCTTTAAGCGAAGGAAAAGTTTTTCCCGTGAA	
GATTACCTTAAGCGAAAACCTTGCCATCTTTGAGTTCGCGGATCCGGAGT	800
TCGGAGAAGCGAGAGAGGAAATTGAAGTGGAGTACACGGGAGAGCCCTTT	
GAGATAGGATTCAACGGAAATACCTTATGGAGGCGCTTGACGCCTACGAC	900
AGCGAAAGAGTGTGGTTCAAGTTCACAACCCCCGACACGGCCACTTTATT	
GGAGGCTGAAGATTACGAAAAGGAACCTTACAAGTGCATAATAATGCCGA	1000
TGAGGGTGTAGCCATGAAAAAGCTTTAATCTTTTTTATTGAGCTTGAGCC	
TTTTAATTCCTGCGTTTAGCGAAGCCAAACCCAAGTCTTC	1090

**FIG. 38**

MRVKVDREELEEV LKKARESTEKKAALPILANFLLSAKEENLIVRATDLE	
NYLVVSVKGEVEEEGEVCVHSQKLYDIVKNLNSAYVYLHTEGEKLVITGG	100
KSTYKLPTAPAEDFPEFPEIVEGGETLSGNLLVNGIEKVEYAIKEEANI	
ALQGMYL RGYEDRIHFVGS DGHRLALYEPLGEFSKELLI PRKSLKVLKKL	200
ITGIEDVNIEKSEDES FAYFSTPEWKLA VRLL EGEFPDYSV IPEEFSAE	
VLFE TEEVLKVLKRLKALSEGKVFPVKITLSENLAIFEFADPEFGEAREE	300
IEVEYTGE PF EIGFNGKYLMEALDAYDSERVWFKFTTPDTATLLEAEDYE	
KEPYKCI IMPMRV	363

**FIG. 39**

GTGGAAACCACAATATTCCAGTTCAGAAAACCTTTTTTCACAAAACCTCC	
GAAGGAGAGGGTCTTCGTCCTTCATGGAGAAGAGCAGTATCTCATAAGAA	100
CCTTTTTGTCTAAGCTGAAGGAAAAGTACGGGGAGAATTACACGGTTCTG	
TGGGGGGATGAGATAAGCGAGGAGGAATTCTACACTGCCCTTTCCGAGAC	200
CAGTATATTTCGGCGGTTCAAAGGAAAAAGCGGTGGTCATTTACAACCTTCG	
GGGATTTCTTGAAGAAGCTCGGAAGGAAGAAAAAGGAAAAAGAAAGGCTT	300
ATAAAAGTCCTCAGAAACGTAAAGAGTAACTACGTATTTATAGTGTACGA	
TGCGAAACTCCAGAAACAGGAACCTTCTTCGGAACCTCTGAAATCCGTAG	400
CGTCTTTCGGCGGTATAGTGGTAGCAAACAGGCTGAGCAAGGAGAGGATA	
AAACAGCTCGTCCTTAAGAAGTTCAAAGAAAAAGGGATAAACGTAGAAAA	500
CGATGCCCTTGAATACCTTCTCCAGCTCACGGGTTACAACCTTGATGGAGC	
TCAAACCTTGAGGTTGAAAAACTGATAGATTACGCAAGTGAAAAGAAAATT	600
TTAACACTCGATGAGGTAAAGAGAGTAGCCTTCTCAGTCTCAGAAAACGT	
AAACGTATTTGAGTTCGTTGATTTACTCCTCTTAAAGATTACGAAAAGG	700
CTCTTAAAGTTTTTGACTCCCTCATTTCTTCGGAATACACCCCCTCCAG	
ATTATGAAAATCCTGTCCTCCTATGCTCTAAACTTTACACCCTCAAGAG	800
GCTTGAAGAGAAGGGAGAGGACCTGAATAAGGCGATGGAAAGCGTGGGAA	
TAAAGAACAACCTTCTCAAGATGAAGTTCAAATCTTACTTAAAGGCAAAC	900
TCTAAGAGGACTTGAAGAACCTAATCCTCTCCCTCCAGAGGATAGACGC	
TTTTTCTAAACTTTACTTTTACAGGACACAGTGCAGTTGCTGGGGATTTCTT	1000
GACCTCAAGACTGGAGAGGGAAGTTGTGAAAAATACTTCTCATGGTGGAT	
AATCTTTTTTATGAAGTTTGCGGTTTGCGTTTTTCCCGGTTCT	1093

**FIG. 40**

VETTIFQFQKTFFTKPPKERVFLHGEEQYLIRTFLSKLKEKYGENYTVL	
WGDEISEEEFYTALSETSI FGGSKEKAVVIYNFGDFLKKLGRKKKEKERL	100
IKVLRNVKSNYVFIVYDAKLQKQELSSEPLKSVASFGGIVVANRLSKERI	
KQLVLKKFKEKGINVENDALEYLLQLTGYNLMELKLEVEKLIDYASEKKI	200
LTLDEVKRVAFSVSENVNVFEFVDLLLLLDYKALKVLDLSISFGIHPLQ	
IMKILSSYALKLYTLKRLEEKGEDLNKAMESVGIKNNFLKMKFKSYLKAN	300
SKEDLKNLILSLQRIDAFSKLYFQDTVQLLRDFLTSLRLEREVVKNTSHGG	

**FIG. 41**

ATGGAAAAAGTTTTTTTGGAAAACTCCAGAAAACCTTGCACATACCCGG	
AGGACTCCTTTTTTACGGCAAAGAAGGAAGCGGAAAGACGAAAACAGCTT	100
TTGAATTTGCAAAAGGTATTTTATGTAAGGAAAACGTACCTGGGGATGCG	
GAAGTTGTCCCTCCTGCAAACACGTAAACGAGCTGGAGGAAGCCTTCTTT	200
AAAGGAGAAATAGAAGACTTTAAAGTTTATAAGACAAGGACGGTAAAAAG	
CACTTCGTTTACCTTATGGGCGAACATCCCGACTTTGTGGTAATAATCCC	300
GAGCGGACATTACATAAAGATAGAACAGATAAGGGAAGTTAAGAACTTTG	
CCTATGTGAAGCCCGCACTAAGCAGGAGAAAAGTAATTATAATAGACGAC	400
GCCACGCGATGACCTCTCAGGCGGCAAACGCTCTTTTAAAGGTATTGGA	
AGAGCCACCTGCGGACACCACCTTTATCTTGACCACGAACAGGCGTTCTG	500
CAATCCTGCCGACTATCCTCTCCAGAACTTTTCAAGTGGAGTTCAAGGGC	
TTTTTCAGTAAAAGAGGTTATGGAAATAGCGAAAGTAGACGAGGAAATAGC	600
GAAACTCTCTGGAGGCAGTCTAAAAAGGGCTATCTTACTAAAGGAAAACA	
AAGATATCCTAAACAAAGTAAAGGAATTCTTGGAACGAGCCGTTAAAA	700
GTTTACAAGCTTGCAAGTGAATTCGAAAAGTGGGAACCTGAAAAGCAAAA	
ACTCTTCCTTGAAATTATGGAAGAATTGGTATCTCAAAAATTGACCGAAG	800
AGAAAAAAGACAATTACACCTACCTTCTTGATACGATCAGACTCTTTAA	
GACGGACTIONGCAAGGGGTGTAAACGAACCTCTGTGGCTGTTTACGTTAGC	900
CGTTCAGGCGGATTAATAAACCGTTATTGATTCCGTAACATTTAAACCTT	
AATCTAAATTATGAGAGCCTTTGAAGGAGGTCTGGTATGGAAAATTTGAA	1000
GATTAGATATATAGATACGAGGAAGATAGGAACCGTGAGCGGTGTAAAAG	
T	1051

FIG. 42

MEKVFLEKLQKTLHIPGGLLFYGKEGSGKTKTAFEFAKGILCKENVPWGC	
GSCPSCKHVNELEEAFFKGEIEDFKVYKDKDGKKHFVYLMGEHPDFVVII	100
PSGHYIKIEQIREVKNFAYVKPALSRRKVI IIDDAHAMTSQAANALLKVL	
EEPPADTTFILTTNRRSAILPTILSRTFQVEFKGFSVKEVMEIAKVDEEI	200
AKLSGGS�KRAILLKENKDILNKVKEFLENEPLKVYKLASEFEKWEPEKQ	
KLFLEIMEELVSQKLTEEKDNYTYLLDTIRLFKDGLARGVNEPLWLFTL	300
AVQAD	

FIG. 43

ATGAACTTCCTGAAAAAGTTCCTTTTACTGAGAAAAGCTCAAAAGTCTCC	
TTACTTCGAAGAGTTCTACGAAGAAATCGATTTGAACCAGAAGGTGAAAG	100
ATGCAAGGTTTGTAGTTTTTGGACTGCGAAGCCACAGAACTCGACGTAAAG	
AAGGCAAAACTCCTTTCAATAGGTGCGGTTGAGGTTAAAAACCTGGAAAT	200
AGACCTCTCTAAATCTTTTACGAGATACTCAAAAGTGACGAGATAAAGG	
CGGCGGAGATACATGGAATAACCAGGGAAGACGTTGAAAAGTACGGAAAG	300
GAACCAAAGGAAGTAATATACGACTTTCTGAAGTACATAAAGGGAAGCGT	
TCTCGTTGGCTACTACGTGAAGTTTGACGTCTCACTCGTTGAGAAGTACT	400
CCATAAAGTACTTCCAGTATCCAATCATCAACTACAAGTTAGACCTGTTT	
AGTTTCGTGAAGAGAGAGTACCAGAGTGGCAGGAGTCTTGACGACCTTAT	500
GAAGGAACTCGGTGTAGAAATAAGGGCAAGGCACAACGCCCTTGAAGATG	
CCTACATAACCGCTCTTCTTTTCTAAAGTACGTTTACCCGAACAGGGAG	600
TACAGACTAAAGGATCTCCCGATTTTCCTT	

**FIG. 44**

MNFLKKFLLLRKAQKSPYFEEFYEEIDLNQKVKDARFVVFDCEATELDVK	
KAKLLSIGAVEVKNLEIDLSKSFYEILKSDEIKAAEIHGITREDVEKYGK	100
EPKEVIYDFLKYIKGSVLVGYVVKFDVSLVEKYSIKYFQYPIINYKLDLF	
SFVKREYQSGRSLDDLMKELGVEIRARHNALEDAYITALLFLKYVYPNRE	200
YRLKDLPIFL	

**FIG. 45**

ATGCTCAATAAGGTTTTTATAATAGGAAGACTTACGGGTGACCCCGTTAT	
AACTTATCTACCGAGCGGAACGCCCGTAGTAGAGTTTACTCTGGCTTACA	100
ACAGAAGGTATAAAAACCAGAACGGTGAATTTTCAGGAGGAAAGTCACTTC	
TTTGACGTAAAGGCGTACGGAAAAATGGCTGAAGACTGGGCTACACGCTT	200
CTCGAAAGGATACCTCGTACTCGTAGAGGGAAGACTCTCCCAGGAAAAGT	
GGGAGAAAGAAGGAAAGAAGTTCTCAAAGGTCAGGATAATAGCGGAAAAC	300
GTAAGATTAATAAACAGGCCGAAAGGTGCTGAACTTCAAGCAGAAGAAGA	
GGAGGAAGTTCCTCCCATTTGAGGAGGAAATTGAAAACTCGGTAAAGAGG	400
AAGAGAAGCCTTTTACCGATGAAGAGGACGAAATACCTTTTAAATTTTGA	
GGAGGTTAAAGTATGGTAGTGAGAGCTCCTAAGAAGAAAGTTTGTATGTA	500
CTGTGAACAAAAGAGAGAGCCAGATT	

**FIG. 46**

MLNKVFIIGRLTGDPVITYLPSGTPVVEFTLAYNRRYKNQNGEFQEESHF	
FDVKAYGKMAEDWATRFSGYLVLVEGRLSQEKWEKEGKKFSKVRIIAEN	100
VRLINRPKGAEHQAEVEVPPIEEEIEKLGKEEEKPFTDEEDEIPF	

**FIG. 47**



ATGCAATTTGTGGATAAACTTCCCTGTGACGAATCCGCCGAGAGGGCGGT	
TCTTGGCAGTATGCTTGAAGACCCCGAAAACATACCTCTGGTACTTGAAT	100
ACCTTAAAGAAGAAGACTTCTGCATAGACGAGCACAAGCTACTTTTCAGG	
GTTCTTACAAACCTCTGGTCCGAGTACGGCAATAAGCTCGATTTTCGTATT	200
AATAAAGGATCACCTTGAAAAGAAAACTTACTCCAGAAAATACCTATAG	
ACTGGCTCGAAGAACTCTACGAGGAGGCGGTATCCCCTGACACGCTTGAG	300
GAAGTCTGCAAAATAGTAAAACAACGTTCCGCACAGAGGGCGATAATTCA	
ACTCGGTATAGAACTCATTACAAAGGAAAGGAAAACAAAGACTTTCACA	400
CATTAATCGAGGAAGCCCAGAGCAGGATATTTTCCATAGCGGAAAGTGCT	
ACATCTACGCAGTTTTTACCATGTGAAAGACGTTGCGGAAGAAGTTATAGA	500
ACTCATTTATAAATTCAAAAGCTCTGACAGGCTAGTCACGGGACTCCCAA	
GCGGTTTCACGGAACTCGATCTAAAGACGACGGGATTCCACCCTGGAGAC	600
TTAATAATACTCGCCGCAAGACCCGGTATGGGGAAAACCGCCTTTATGCT	
CTCCATAATCTACAATCTCGCAAAAGACGAGGGAAAACCCTCAGCTGTAT	700
TTTCCTTGGAATGAGCAAGGAACAGCTCGTTATGAGACTCCTCTCTATG	
ATGTCCGAGGTCCCACTTTTCAAGATAAGGTCTGGAAGTATATCGAATGA	800
AGATTTAAAGAAGCTTGAAGCAAGCGCAATAGAACTCGCAAAGTACGACA	
TATACCTCGACGACACACCCGCTCTCACTACAACGGATTTAAGGATAAGG	900
GCAAGAAAGCTCAGAAAGGAAAAGGAAGTTGAGTTCGTGGCGGTGGACTA	
CTTGCAACTTCTGAGACCGCCAGTCCGAAAGAGTTCAAGACAGGAGGAAG	1000
TGGCAGAGGTTTCAAGAACTTAAAAGCCCTTGCAAAGGAACTTCACATT	
CCCGTTATGGCACTTGCGCAGCTCTCCCGTGAGGTGGAAAAGAGGAGTGA	1100
TAAAAGACCCAGCTTGCGGACCTCAGAGAATCCGGACAGATAGAACAGG	
ACGCAGACCTAATCCTTTTCTCCACAGACCCGAGTACTACAAGAAAAAG	1200
CCAAATCCCGAAGAGCAGGGTATAGCGGAAGTGATAATAGCCAAGCAAAG	
GCAAGGACCCACGGACATTGTGAAGCTCGCATTTATTAAGGAGTACACTA	1300
AGTTTGCAAACCTAGAAGCCCTTCTGAACAACCTCCTGAAGAAGAGGAA	
CTTCCGAAATTATTGAAACACAGGAGGATGAAGGATTGGAAGATATTGA	1400
CTTCTGAAAATTAAGGTTTTTATAATTTTATCTTGGCTATCCGGGGTAGCT	
CAATCGGCAGAGCGGGTGGCTG	1472

FIG. 48

MQFVDKLPDESAERA VLGSMLEDPENIPLVLEYLKEEDFCIDEHKLLFR	
VLTNLWSEYGNKLDFVLIKDHLEKKNLLQKIPIDWLEELYEEAVSPDTLE	100
EVCKIVKQRSAQR AIIQLGITSTQFYHVKDVAEEVIELIYKFKSSDRLVT	
GLPSGFTELDLKTTFHFGDLIIILARP GPMGKTAFMLSIIYNLAKDEGKP	200
SAVFSLEMSKEQLVMRLLSMMSEVPLFKIRSGSISNEDLKKLEASAIELA	
KYDIYLLDDTPALTTTDLRIRARKLRKEKEVEFVAVDYLQLLRPPVRKSSR	300
QEEVAEVSRLKALAKELHIPVMALAQLSREVEKRSDKRPQLADLRESGQ	
IEQDADLILFLHRPEYYKKKPNPEEQGIAEVIIAKQRQGPTDIVKLAFIK	400
EYTKFANLEALPEQPPEEEELSEIIETQEDEGFEDIDF	

FIG. 49

ATGTCCTCGGACATAGACGAACTTAGACGGGAAATAGATATAGTAGACGT	
CATTTCCGAATACTTAAACTTAGAGAAGGTAGGTTCCAATTACAGAACGA	100
ACTGTCCCTTTCACCCTGACGATACACCCTCCTTTTACGTGTCTCCAAGT	
AAACAAATATTCAAGTGTTTCGGTTGCGGGGTAGGGGGAGACGCGATAAA	200
GTTTCGTTTCCCTTTACGAGGACATCTCCTATTTTGAAGCCGCCCTTGAAC	
TCGCAAAACGCTACGGAAAGAAATTAGACCTTGAAAAGATATCAAAAGAC	300
GAAAAGGTATACGTGGCTCTTGACAGGGTTTGTGATTTCTACAGGGAAAG	
CCTTCTCAAAAACAGAGAGGCAAGTGAGTACGTAAAGAGTAGGGGAATAG	400
ACCCTAAAGTAGCGAGGAAGTTTGATCTTGGGTACGCACCTTCCAGTGAA	
GCACTCGTAAAAGTCTTAAAAGAGAACGATCTTTTAGAGGCTTACCTTGA	500
AACTAAAACCTCCTTTCTCCTACGAAGGGTGTTTACAGGGATCTCTTTC	
TTCGGCGTGTCGTGATCCCGATAAAGGATCCGAGGGGAAGAGTTATAGGT	600
TTCGGTGGAAGGAGGATAGTAGAGGACAAATCTCCCAAGTACATAAACTC	
TCCAGACAGCAGGGTATTTAAAAGGGGGAGAACTTATTCGGTCTTTACG	700
AGGCAAAGGAGTATATAAAGGAAGAAGGATTTGCGATACTTGTGGAAGGG	
TACTTTGACCTTTTGAGACTTTTTTCCGAGGGAATAAGGAACGTTGTTGC	800
ACCCCTCGGTACAGCCCTGACCCAAAATCAGGCAAACCTCCTTTCCAAGT	
TCACAAAAAAGGTCTACATCCTTTACGACGGAGATGATGCGGGAAGAAAG	900
GCTATGAAAAGTGCCATTCCCCTACTCCTCAGTGCAGGAGTGGAAGTTTA	
TCCCGTTTACCTCCCCGAAGGATACGATCCCGACGAGTTTATAAAGGAAT	1000
TCGGGAAAGAGGAATTAAGAAGACTGATAAACAGCTCAGGGGAGCTCTTT	
GAAACGCTCATAAAAACCGCAAGGGAAAACCTTAGAGGAGAAAACGCGTGA	1100
GTTCAGGTATTATCTGGGCTTTATTTCCGATGGAGTAAGGCGCTTTGCTC	
TGGCTTCGGAGTTTCACACCAAGTACAAAGTTCCTATGGAAATTTTATTA	1200
ATGAAAATTGAAAAAATTCTCAAGAAAAAGAAATTAACTCTCCTTTAA	
GGAAAAAATCTTCCTGAAAGGACTGATAGAATTAAAACCAAAAATAGACC	1300
TTGAAGTCCTGAACTTAAGTCCTGAGTTAAAGGAACTCGCAGTTAACGCC	
TTAAACGGAGAGGAGCATTTACTTCCAAAAGAAGTTCTCGAGTACCAGGT	1400
GGATAACTTGGAGAACTTTTTAACAACATCCTTAGGGATTTACAAAAAT	
CTGGGAAAAGAGGAAGAAAAGAGGGTTGAAAAATGTAAATACTTAATTA	1500
ACTTTAATAAATTTTATAGAGTTAGGA	

FIG. 50

MSSDIDELRREIDIVDVI SEYLNLEKVGSNYRTNCPFHPDDTPSFYVSPS	
KQIFKCFGCGVGDAIKFVSLYEDISYFEAALELAKRYGKKLDLEKISKD	100
EKVYVALDRVCDFYRESLLKNREASEYVKSRGIDPKVARKFDLGYAPSSE	
ALVKVLKENDLLEAYLETKNLLSPTKGVYRDLFLRRVVIPIKDPRGRVIG	200
FGGRRIVEDKSPKYINSPDSRVFKKGENLFGLYEAKYIKEEGFAILVEG	
YFDLLRLFSEGIRNVVAPLGTALTQNQANLLSKFTKKVYILYDGDDAGRK	300
AMKSAIPLLLSAGVEVPVYLPEGYDPDEFIKEFGKEELRRLINSSGELF	
ETLIKARENLEEKTRFRYYLGFISDGVRRFALASEFHTKYKVPMEILL	400
MKIEKNSQEKEIKLSFKEKIFLKGLIELKPKIDLEVLNLSPELKE LAVNA	
LNGEEHLLPKEVLEYQVDNLEKLFNNILRDLQKSGKKRKRGLKNVNT	498

FIG. 51

ATGCAAGATACCGCTACCTGCAGTATTTGTCAGGGGACGGGATTTCGTAAA	
GACCGAAGACAACAAGGTAAGGCTCTGCGAATGCAGGTTCAAGAAAAGGG	100
ATGTAAACAGGGAACTAAACATCCCAAAGAGGTACTGGAACGCCAACTTA	
GACACTTACCACCCCAAGAACGTATCCCAGAACAGGGCACTTTTGACGAT	200
AAGGGTCTTCGTCCACAACCTTCAATCCCGAGGAAGGGAAAGGGCTTACCT	
TTGTAGGATCTCCTGGAGTCGGCAAAACTCACCTTGCGGTTGCAACATTA	300
AAAGCGATTTATGAGAAGAAGGGAATCAGAGGATACTTCTTCGATACGAA	
GGATCTAATATTCAGGTTAAAACACTTAATGGACGAGGGAAAGGATACAA	400
AGTTTTTAAAAACTGTCTTAAACTCACCGGTTTTTGGTTCTCGACGACCTC	
GGTTCTGAGAGGCTCAGTGA CTGGCAGAGGGAACTCATCTCTTACATAAT	500
CACTTACAGGTATAACAACCTTAAGAGCACGATAATAACCACGAATTACT	
CACTCCAGAGGGAAGAAGAGAGTAGCGTGAGGATAAGTGCGGATCTTGCA	600
AGCAGACTCGGAGAAAACGTAGTTTCAAAAATTTACGAGATGAACGAGTT	
GCTCGTTATAAAGGGTTCGACCTCAGGAAGTCTAAAAAGCTATCAACCC	700
CATCT	

**FIG. 52**

MQDTATCSICQGTGFVKTEDNKVRLCECRFKKRDVNRELNIPKRYWNANL	
DTYHPKNVSQNRALLTIRVFVHNFNPEEGKGLTFVGSPGVGKTHLAVATL	100
KAIYEKKGIRGYFFDTKDLIFRLKHLMDDEGKDTKFLKTVLNSPVLVLDL	
GSERLSDWQRELISYIITYRYNNLKSTIITTNYSLOREEESSVRISADLA	200
SRLGENVVSKIYEMNELLVIKGSDLRKS SKLSTPS	

**FIG. 53**

ATGAAAAAGATTGAAAATTTGAAGTGGAAAAATGTCTCGTTTAAAAGCCT	
GGAAATAGATCCCGATGCAGGTGTGGTTCTCGTTTCCGTGGAAAAATTCT	100
CCGAAGAGATAGAAGACCTTGTGCGTTTACTGGAGAAGAAGACGCGGTTT	
CGAGTCATCGTGAACGGTGTTCAAAAAAGTAACGGGGATCTAAGGGGAAA	200
GATACTTTCCCTTCTCAACGGTAATGTGCCTTACATAAAAGATGTTGTTT	
TCGAAGGAAACAGGCTGATTCTGAAAGTGCTTGGAGATTTTCGCGCGGGAC	300
AGGATCGCCTCCAAACTCAGAAGCACGAAAAAACAGCTCGATGAACTGCT	
GCCTCCCGGAACAGAGATCATGCTGGAGGTTGTGGAGCCTCCGGAAGATC	400
TTTTGAAAAAGGAAGTACCACAACCAGAAAAGAGAGAAGAACCAAAGGGT	
GAAGAATTGAAGATCGAGGATGAAAACCATCTTTGGACAGAAACCCAG	500
AAAGATCGTCTTCACCCCTCAAAAATCTTTGAGTACAACAAAAGACAT	
CGGTGAAGGGCAAGATCTTCAAATAGAGAAGATCGAGGGGAAAAGAACG	600
GTCCTTCTGATTTACCTGACAGACGGAGAAGATTCTCTGATCTGCAAAGT	
CTTCAACGACGTTGAAAAGGTCGAAGGGGAAAGTATCGGTGGGAGACGTGA	700
TCGTTGCCACAGGAGACCTCCTTCTCGAAAACGGGGAGCCCACCCTTTAC	
GTGAAGGGAATCACAAAACCTCCCGAAGCGAAAAGGATGGACAAATCTCC	800
GGTTAAGAGGGTGGAGCTCCACGCCCATAACCAAGTTCAGCGATCAGGACG	
CAATAACAGATGTGAACGAATATGTGAAACGAGCCAAGGAATGGGGCTTT	900
CCCGCGATAGCCCTCACGGATCATGGGAACGTTCAAGGCCATACCTTACTT	
CTACGACGCGGCGAAAGAAGCTGGAATAAAGCCCATTTCGGTATCGAAG	1000
CGTATCTGGTGAGTGACGTGGAGCCCGTCATAAGGAATCTCTCCGACGAT	
TCGACGTTTGGAGATGCCACGTTTCGTCGTCCTCGACTTCGAGACGACGGG	1100
TCTCGACCCGCAGGTGGATGAGATCATCGAGATAGGAGCGGTGAAGATAC	
AGGGTGGCCAGATAGTGGACGAGTACCACACTCTCATAAAGCCTTCCAGG	1200
GAGATCTCAAGAAAAAGTTTCGGAGATCACCGGAATCACTCAAGAGATGCT	
GGAAAACAAGAGAAGCATCGAGGAAGTTCTGCCGGAGTTCCTCGGTTTTC	1300
TGGAAGATTCCATCATCGTAGCACACAACGCCAACTTCGACTACAGATTT	
CTGAGGCTGTGGATCAAAAAAGTGATGGGATTGGACTGGGAAAGACCCTA	1400
CATAGATACGCTCGCCCTCGCAAAGTCCCTTCTCAAACCTGAGAAGCTACT	
CTCTGGATTCCGTTGTGGAAAAGCTCGGATTGGGTCCCTTCCGGCACCAC	1500
AGGGCCCTGGATGACGCGAGGGTCACCGCTCAGGTTTTCTCAGGTTTCGT	
TGAGATGATGAAGAAGATCGGTATCACGAAGCTTTCAGAAATGGAGAAGT	1600
TGAAGGATACGATAGACTACACCGCGTTGAAACCCTTCCACTGCACGATC	
CTCGTTCAGAACAAAAAGGGATTGAAAAACCTATACAAACTGGTTTCTGA	1700
TTCTATATAAAGTACTTCTACGGTGTTCAGGATCCTCAAAAGTGAGC	
TCATCGAGAACAGAGAAGGACTGCTCGTGGGTAGCGCGTGTATCTCCGGT	1800
GAGCTCGGACGTGCCGCCCTCGAAGGAGCGAGTGATTCAGAACTCGAAGA	
GATCGCGAAGTTCTACGACTACATAGAAGTCATGCCGCTCGACGTTATAG	1900
CCGAAGATGAAGAAGACCTAGACAGAGAAAGACTGAAAGAAGTGTAACGA	
AAACTCTACAGAATAGCGAAAAAATTGAACAAGTTCGTCGTCATGACCGG	2000
TGATGTTCAATTCCTCGATCCCGAAGATGCCAGGGGCAGAGCTGCACTTC	
TGGCACCTCAGGGAAACAGAACTTCGAGAATCAGCCCGCACTCTACCTC	2100
AGAACGACCGAAGAAATGCTCGAGAAGGCGATAGAGATATTCGAAGATGA	
AGAGATCGCGAGGGGAAGTCGTGATAGAGAATCCCAACAGAATAGCCGATA	2200
TGATCGAGGAAGTGCAGCCGCTCGAGAAAAAATTCACCCGCCGATCATA	
GAGAACGCCGATGAAATAGTGAGAAACCTCACCATGAAGCGGGCGTACGA	2300
GATCTACGGTGATCCGCTTCCCGAATCGTCCAGAAGCGTGTGGAAAAGG	

FIG. 54A



AACTGAACGCCATCATAAATCATGGATACGCCGTTCTCTATCTCATCGCT	2400
CAGGAGCTCGTTCAGAAATCTATGAGCGATGGTTACGTGGTTGGATCCAG	
AGGATCCGTCGGGTCTTCACTCGTGGCCAATCTCCTCGGAATAACAGAGG	2500
TGAATCCCCTACCACCACATTACAGGTGTCCAGAGTGCAAATACTTTGAA	
GTTGTCGAAGACGACAGATACGGAGCGGGTTACGACCTTCCCAACAAGAA	2600
CTGTCCAAGATGTGGGGCTCCTCTCAGAAAAGACGGCCACGGCATAACCGT	
TTGAAACGTTTCATGGGGTTTCGAGGGTGACAAGGTCCCCGACATAGATCTC	2700
AACTTCTCAGGAGAGTATCAGGAACGTGCTCATCGTTTTTGTGGAAGAACT	
CTTCGGTAAAGACCACGTCTATAGGGCGGGAACCATAAACACCATCGCGG	2800
AAAGAAGTGCGGTGGGTACGTGAGAAGCTACGAAGAGAAAACCGGAAAG	
AAGCTCAGAAAGGCGGAAATGGAAAGACTCGTTTCCATGATCACGGGAGT	2900
GAAGAGAACGACGGGTGAGCACCCAGGGGGGCTCATGATCATAACCGAAAG	
ACAAAGAAGTCTACGATTTCACTCCCATACAGTATCCAGCCAACGATAGA	3000
AACGCAGGTGTGTTCAACACGCACTTCGCATACGAGACGATCCATGATGA	
CCTGGTGAAGATAGATGCGCTCGGCCACGATGATCCCACTTTTCATCAAGA	3100
TGCTCAAGGACCTCACCGGAATCGATCCCATGACGATTCCCATGGATGAC	
CCCGATACGCTCGCCATATTCAAGTTCTGTGAAGCCTCTTGGTGTGGATCC	3200
CGTTGAGCTGGAAAGCGATGTGGGAACGTACGGAATTCCGGAGTTCGGAA	
CCGAGTTTGTGAGGGGAATGCTCGTTGAAACGAGACCAAAGAGTTTCGCC	3300
GAGCTTGTGAGAATCTCAGGACTGTACACCGGTACGGACGTCTGGTTGAA	
CAACGCACGTGATTGGATAAACCTCGGCTACGCCAAGCTCTCCGAGGTTA	3400
TCTCGTGTAGGGACGACATCATGAACTTCCTCATAACAAAGGAATGGAA	
CCGTCACTTGCCTTCAAGATCATGGAAAACGTACAGGAAGGGAAAGGGTAT	3500
CACAGAAGAGATGGAGAGCGAGATGAGAAGGCTGAAGGTTCCAGAATGGT	
TCATCGAATCCTGTAAAAGGATCAAATATCTCTTCCCGAAAGCTCACGCT	3600
GTGGCTTACGTGAGTATGGCCTTCAGAATTGCTTACTTCAAGGTTCACTA	
TCCTCTTCAGTTTTACGCGGCGTACTTCACGATAAAAGGTGATCAGTTCG	3700
ATCCGGTTCTCGTACTCAGGGGAAAAGAAGCCATAAAGAGGCGCTTGAGA	
GAAC TCAAAGCGATGCCTGCCAAAGACGCCCAGAAGAAAAACGAAGTGAG	3800
TGTTCTGGAGGTTGCCCTGGAAATGATACTGAGAGGTTTTTCCTTCCTAC	
CGCCCGACATCTTCAAATCCGACGCGAAGAAATTTCTGATAGAAGGAAAC	3900
TCGCTGAGAATTCCGTTCAACAAACTTCCAGGACTGGGTGACAGCGTTGC	
CGAGTCGATAATCAGAGCCAGGGAAGAAAAGCCGTTCACTTCGGTGGAAG	4000
ATCTCATGAAGAGGACCAAGGTCAACAAAAATCACATAGAGCTGATGAAA	
AGCCTGGGTGTTCTCGGGGACCTTCCAGAGACGGAACAGTTCACGCTTTT	4100

C

**FIG. 54B**



MKKIENLKWKNVSFKSLEIDPDAGVVLVSVEKFSEEIEDLVRLLLEKKTRF	
RVIVNGVQKSNGDLRGKILSLNNGNVPYIKDVVFEGNRLILKVLGDFARD	100
RIASKLRSTKKQLDELLPPGTEIMLEVVEPPEDLLKKEVPQPEKREEPKG	
EELKIEDENHIFGQKPRKIVFTPSKIFEYNKKTsvkgkIFKIEKIEGKRT	200
VLLIYLTdGEDSLICKVFNDVEKVEGKVSvgDVIVATGDLLLENGEPTLY	
VKGITKLPEAKRMDKSPVKRVELHAHTKFSdQDAITDVNEYVKRAKEWGF	300
PAIALTDHGNVQAIPYFYDAAKEAGIKPIFGIEAYLVSDVEPVIRNLSDD	
STFGDATFVVLDfETTGLDPQVDEIIEIGAVKIQGGQIVDEYHTLIKPSR	400
EISRKSSSEITGITQEMLENKRSIEEVLPEFLGfLEDsIIVAHNANFDYRF	
LRLWIKKVMGLDWERPYIDTLALAKSLLKLRSYSLDSVVEKLGLGPFRHH	500
RALDDARVTAQVFLRFVEMMKIGITKLSEMEKLKDTIDYTALKPFHCTI	
LVQNKKGKLNLYKLVSDSYIKYFYGVPRILKSELIEENREGLLVGSACISG	600
ELGRAALEGASDSELEEIAKFYDYIEVMPLDVIAEDEEDLDRERLKEVYR	
KLYRIAKKLNKFVVMtGDVHFLDPEDARGRAALLAPQGNRNfENQPALYL	700
RTTEEMLEKAIEIFEDEEIAREVVIENPNRIADMIEEVQPLEKKLHPPII	
ENADEIVRNLTMKRAYEIIYGDPLPEIVQKRVEKELNAIINHGYAVLYLIA	800
QELVQKSMsDGYVVGSRGsvGSSLVANLLGITEVNPLPPHYRCPECKYFE	
VVEDDRYGAGYDLPNKNcPRCGAPLRKDGHGIPFETFMGFEGDKVPDIDL	900
NFSGEYQERAHRFVEELFGKDHVYRAGTINTIAERSAVGYVRSYEEKTGK	
KLRKAEMERLVSMITGVKRTTGQHPGGLMIIPKDKEVYDFTPIQYPANDR	1000
NAGVFTTHFAYETIHDDLVKIDALGHDDPTFIKMLKDLTGIDPMTIPMDD	
PDTLAIFFSSVKPLGVDPVELESdVGTYGIPEFGTEFVRGMLVETRPKSFA	1100
ELVRISGLSHGTDVWLNNARDWINLGYAKLSEVISCRDDIMNFLIHKGME	
PSLAFKIMENVRKGGKITEEMESEMRLKVPEWFIESCKRIKYLFPKAHA	1200
VAYVSMAFRIAYFKVHYPLQFYAAyFTIKGDQFDpVLVLRGKEAIKRRLR	
ELKAMPAKDAQKKNEVSVLEVALEMILRGFSFLPPDIFKSDAKKFLIEGN	1300
SLRIPFNKLPGLGDSVAESIIRAREEKpFTSVEDLMKRTKVKNHIELMK	
SLGVLGDLPETEQFTLF	1367

FIG. 55

GTGCTCGCCATGATATGGAACGACACCGTTTTTTGCGTCGTAGACACAGA	
AACCACGGGAACCGATCCCTTTGCCGGAGACCGGATAGTTGAAATAGCCG	100
CTGTTCTGTCTTCAAGGGGAAGATCTACAGAAACAAAGCGTTTCACTCT	
CTCGTGAATCCCAGAATAAGAATCCCTGCGCTGATTCAGAAAGTTCACGG	200
TATCAGCAACATGGACATCGTGGAAGCGCCAGACATGGACACAGTTTACG	
ATCTTTTCAGGGATTACGTGAAGGGAACGGTGCTCGTGTTTCACAACGCC	300
AACTTCGACCTCACTTTTCTGGATATGATGGCAAAGGAAACGGGAAACTT	
TCCAATAACGAATCCCTACATCGACACACTCGATCTTTCAGAAGAGATCT	400
TTGGAAGGCCTCATTCTCTCAAATGGCTCTCCGAAAGACTTGGAATAAAA	
ACCACGATACGGCACCGTGCTCTTCCAGATGCCCTGGTGACCGCAAGAGT	500
TTTTGTGAAGCTTGTTGAATTTCTTGGTGAAAACAGGGTCAACGAATTCA	
TACGTGGAAAACGGGGG	567

**FIG. 56**

MLAMIWNDTVFCVVDTETTGTDPFAGDRIVEIAAVPVFKGKIYRNKAFHS	
LVNPRIRIPALIQKVHGISNMDIVEAPDMDTVYDLFRDYVKGTVLVFHNA	100
NFDLTFLDMMAKETGNFPITNPYIDTLDLSEEIFGRPHSLKWLSERLGIK	
TTIRHRALPDALVTARVFVKLVEFLGENRVNEFIRGKRG	189

**FIG. 57**

GTGGAAGTTCTTTACAGGAAGTACAGGCCAAAGACTTTTTCTGAGGTTGT	
CAATCAGGATCATGTGAAGAAGGCAATAATCGGTGCTATTCAGAAGAACA	100
GCGTGGCCACGGATACATATTCGCCGGTCCGAGGGGAACGGGGAAGACT	
ACTCTTGCCAGAATTCTCGCAAATCCCTGAACTGTGAGAACAGAAAGGG	200
AGTTGAACCCTGCAATTCCTGCAGAGCCTGCAGAGAGATAGACGAGGGAA	
CCTTCATGGACGTGATAGAGCTCGACGCGGCCTCCAACAGAGGAATAGAC	300
GAGATCAGAAGAATCAGAGACGCCGTTGGATACAGGCCGATGGAAGGTAA	
ATACAAAGTCTACATAATAGACGAAGTTCACATGCTCACGAAAGAAGCCT	400
TCAACGCGCTCCTCAAAACACTCGAAGAACCTCCTTCCCACGTCGTGTTT	
GTGCTGGCAACGACAAACCTTGAGAAGGTTCTTCCCACGATTATCTCGAG	500
ATGTCAGGTTTTTCGAGTTCAGAAACATTCCCGACGAGCTCATCGAAAAGA	
GGCTCCAGGAAGTTGCGGAGGCTGAAGGAATAGAGATAGACAGGGAAGCT	600
CTGAGCTTCATCGCAAAAAGAGCCTCTGGAGGCTTGAGAGACGCGCTCAC	
CATGCTCGAGCAGGTGTGGAAGTTCTCGGAAGGAAAGATAGATCTCGAGA	700
CGGTACACAGGGCGCTCGGGTTGATACCGATACAGGTTGTTTCGCGATTAC	
GTGAACGCTATCTTTTCTGGTGATGTGAAAAGGGTCTTCACCGTTCTCGA	800
CGACGTCTATTACAGCGGGAAGGACTACGAGGTGCTCATTTCAGGAAGCAG	
TCGAGGATCTGGTCGAAGACCTGGAAAGGGAGAGAGGGGTTTACCAGGTT	900
TCAGCGAACGATATAGTTCAGGTTTCGAGACAACCTTCTGAATCTTCTGAG	
AGAGATAAAGTTTCGCCGAAGAAAAACGACTCGTCTGTAAAGTGGGTTCGG	1000
CTTACATAGCGACGAGGTTCTCCACCACAAACGTTTCAGGAAAACGATGTC	
AGAGAAAAAACGATAATTCAAATGTACAGCAGAAAGAAGAGAAGAAAGA	1100
AACGGTGAAGGCAAAAGAAGAAAAACAGGAAGACAGCGAGTTCGAGAAAC	
GCTTCAAAGAACTCATGGAAGAACTGAAAGAAAAGGGCGATCTCTCTATC	1200
TTTGTGCTCTCAGCCTCTCAGAGGTGCAGTTTGACGGAGAAAAGGTGAT	
TATTTCTTTTGATTCATCGAAAGCTATGCATTACGAGTTGATGAAGAAAA	1300
AACTGCCTGAGCTGGAAAACATTTTTCTAGAAAACTCGGGAAAAAAGTA	
GAAGTTGAACTTCGACTGATGGGAAAAGAAGAAACAATCGAGAAGGTTTC	1400
TCAGAAGATCCTGAGATTGTTTGAACAGGAGGGA	

FIG. 58

MEVLYRKYPKTFSEVVNQDHVKKAIIGAIQKNSVAHGYIFAGPRGTGKT	
TLARILAKSLNCENRKGVEPCNSCRACREIDEGTFMDVIELDAASNRGID	100
EIRRIRDAVGYPMEGKYKVYIIDEVHMLTKEAFNALLKTLEPPSHVVF	
VLATTNLEKVPPTIISRCQVFEFRNIPDELIEKRLQEVAAEGIEIDREA	200
LSFIAKRASGGLRDALTMLEQVWKFSSEKIDLETVHRALGLIPIQVVRDY	
VNAIFSGDVKRVFTVLDDVYYSGKDYEVLIQEAVEDLVEDLERERGVYQV	300
SANDIVQVSRQLLNLLREIKFAEEKRLVCKVGSAYIATRFSTTNVQENDV	
REKNDNSNVQQKEEKETVKAKEEKQEDSEFEKRFKELMEELKEKGDLSI	400
FVALSLSEVQFDGEKVIISFDSSKAMHYELMKKKLPELENIFSRKLGKKV	
EVELRLMGKEETIEKVSQKILRLFEQEG	478

FIG. 59

ATGAAAGTAACCGTCACGACTCTTGAATTGAAAGACAAAATAACCATCGC	
CTCAAAAGCGCTCGCAAAGAAATCCGTGAAACCCATTCTTGCTGGATTTC	100
TTTTCGAAGTGAAAGATGGAAATTTCTACATCTGCGCGACCGATCTCGAG	
ACCGGAGTCAAAGCAACCGTGAATGCCGCTGAAATCTCCGGTGAGGCACG	200
TTTTGTGGTACCAGGAGATGTCATTGAGAAGATGGTCAAGGTTCTCCCAG	
ATGAGATAACGGAACCTTTCTTTAGAGGGGGATGCTCTTGTTATAAGTTCT	300
GGAAGCACCGTTTTTCAGGATCACCACCATGCCCCGCGGACGAATTTCCAGA	
GATAACGCCTGCCGAGTCTGGAATAACCTTCGAAGTTGACACTTCGCTCC	400
TCGAGGAAATGGTTGAAAAGGTCATCTTCGCCGCTGCCAAAGACGAGTTC	
ATGCGAAATCTGAATGGAGTTTTCTGGGAACTCCACAAGAATCTTCTCAG	500
GCTGGTTGCAAGTGATGGTTTCAGACTTGCACTTGCTGAAGAGCAGATAG	
AAAACGAGGAAGAGGCGAGTTTCTTGCTCTCTTTGAAGAGCATGAAAGAA	600
GTTCAAAACGTGCTGGACAACACAACGGAGCCGACTATAACGGTGAGGTA	
CGATGGAAGAAGGGTTTCTCTGTCGACAAATGATGTAGAAACGGTGATGA	700
GAGTGGTCGACGCTGAATTTCCCGATTACAAAAGGGTGATCCCCGAAACT	
TTCAAAACGAAAGTGGTGGTTTCCAGAAAAGAACTCAGGGAATCTTTGAA	800
GAGGGTGATGGTGATTGCCAGCAAGGGAAGCGAGTCCGTGAAGTTCGAAA	
TAGAAGAAAACGTTATGAGACTTGTGAGCAAGAGCCCGATTATGGAGAA	900
GTGGTCGATGAAGTTGAAGTTCAAAAAGAAGGGGAAGATCTCGTGATCGC	
TTTCAACCCGAAGTTCATCGAGGACGTTTTGAAGCACATTGAGACTGAAG	1000
AAATCGAAATGAACTTCGTTGATTCTACCAGTCCATGTCAGATAAATCCA	
CTCGATATTTCTGGATACCTTTACATAGTGATGCCCATCAGACTGGCA	1098

FIG. 60

MKVTVTTLLELKDKITIASKALAKKSVKPILAGFLFEVKDGNFYICATDLE	
TGVKATVNAAEISGEARFVVPGDVIQKMVKVLPDEITELSLGDALVISS	100
GSTVFRITTMPADEFPFITPAESGITFEVDTSLLLEEMVEKVIFAAAKDEF	
MRNLNGVFWELHKNLLRLVASDGFRLALAEQIENEEEASFLLSLKSMKE	200
VQNVLDNTTEPTITVRYDGRRVSLSTNDVETVMRVVDAEFPDYKRVIPET	
FKTKVVSRKELRESLKRVMVIAASKGSESVKFEIEENVMLVSKSPDYGE	300
VVDEVEVQKEGEDLVIAFNPKFIEDVLKHIETEEIEMNFVDSTSPCQINP	
LDISGYLYIVMPIRLA	366

FIG. 61

ATGCCAGTCACGTTTCTCACAGGTACTGCAGAACTCAGAAGGAAGAATT	
GATAAAGAACTCCTGAAGGATGGTAACGTGGAGTACATAAGGATCCATC	100
CGGAGGATCCCGACAAGATCGATTTCATAAGGTCTTTACTCAGGACAAAG	
ACGATCTTTTCCAACAAGACGATCATTGACATCGTCAATTTTCGATGAGTG	200
GAAAGCACAGGAGCAGAAGCGTCTCGTTGAACTTTTGAAAAACGTACCGG	
AAGACGTTTCATATCTTCATCCGTTCTCAAAAAACAGGTGGAAAGGGAGTA	300
GCGCTGGAGCTTCCGAAGCCATGGGAAACGGACAAGTGGCTTGAGTGGAT	
AGAAAAGCGCTTCAGGGAGAATGGTTTGCTCATCGATAAAGATGCCCTTC	400
AGCTGTTTTTCTCCAAGGTTGGAACGAACGACCTGATCATAGAAAGGGAG	
ATTGAAAAACTGAAAGCTTATTCGAGGACAGAAAGATAACGGTAGAAGA	500
CGTGGAAGAGGTGCTTTTTTACCTATCAGACTCCGGGATACGATGATTTTT	
GCTTTGCTGTTTCCGAAGGAAAAAGGAAGCTCGCTCACTCTCTTCTGTCTG	600
CAGCTGTGGAAAACACAGAGTCCGTGGTGATTGCCACTGTCCTTGCGAA	
TCACTTCTTGATCTCTTCAAAATCCTCGTTCTTGTGACAAAGAAAAGAT	700
ACTACACCTGGCCTGATGTGTCCAGGGTGTCCAAAGAGCTGGGAATTCCC	
GTTCTCGTGTGGCTCGTTTCCTCGGTTTCTCCTTTAAGACCTGGAAATT	800
CAAGGTGATGAACCACCTCCTCTACTACGATGTGAAGAAGGTTAGAAAGA	
TACTGAGGGATCTCTACGATCTGGACAGAGCCGTGAAAAGCGAAGAAGAT	900
CCAAAACCGTTCTTCCACGAGTTCATAGAAGAGGTGGCACTGGATGTATA	
TTCTCTTCAGAGAGATGAAGAA	972

FIG. 62

MPVTFLTGTAEQKEELIKLLKDG NVEYIRIHPEDPDKIDFIRSLLR TK	
TIFS NKTIIDIVNFDEWKAQE QKRLVELLKNVPEDVHIFIRSQKTGGKGV	100
ALELPKPWETDKWLEWIEKRFR ENGLLIDKDALQLFFSKVGTNDLI IERE	
IEKLKAYSEDRKITVEDVEEVVFTYQTPGYDDFCFAVSEGKRKLAHSLLS	200
QLWKTTESVVIATVLANHFLDLFKILVLVTKKRYYTWPDVSRVSKELGIP	
VPRVARFLGFSFKTWKFKVMNHL LYDVKKVRKILRDLYDL DRAVKSEED	300
PKPFFHEFIEEVALDVYSLQRDEE	

FIG. 63



ATGAACGATTTGATCAGAAAGTACGCTAAAGATCAACTGGAAACTTTGAA	
AAGGATCATAGAAAAGTCTGAAGGAATATCCATCCTCATAAATGGAGAAG	100
ATCTCTCGTATCCGAGAGAAGTATCCCTTGAACCTCCCGAGTACGTGGAG	
AAATTTCCCCCGAAGGCCTCGGATGTTCTGGAGATAGATCCCGAGGGGGA	200
GAACATAGGCATAGACGACATCAGAACGATAAAGGACTTCCTGAACTACA	
GCCCCGAGCTCTACACGAGAAAGTACGTGATAGTCCACGACTGTGAAAGA	300
ATGACCCAGCAGGCGGCGAACGCGTTTCTGAAGGCCCTTGAAGAACCACC	
AGAATACGCTGTGATCGTTCTGAACACTCGCCGCTGGCATTATCTACTGC	400
CGACGATAAAGAGCCGAGTGTTTCTGAGAGTGGTTGTGAACGTTCCAAAGGAG	
TTCAGAGATCTCGTGAAAGAGAAAAATAGGAGATCTCTGGGAGGAACTTCC	500
ACTTCTTGAGAGAGACTTCAAAACGGCTCTCGAAGCCTACAAACTTGGTG	
CGGAAAAACTTTCTGGATTGATGGAAAGTCTCAAAGTTTTTGGAGACGGAA	600
AAACTCTTGAAAAAGGTCCTTTCAAAGGCCTCGAAGGTTATCTCGCATG	
TAGGGAGCTCCTGGAGAGATTTTCAAAGGTGGAATCGAAGGAATTCTTTG	700
CGCTTTTTTGATCAGGTGACTAACACGATAACAGGAAAAGACGCGTTTCTT	
TTGATCCAGAGACTGACAAGAATCATTTCTCCACGAAAACACATGGGAAAG	800
CGTTGAAGATCAAAAAAGCGTGTCTTTCCTCGATTCAATTCTCAGGGTGA	
AGATAGCGAATCTGAACAACAACTCACTCTGATGAACATCCTCGCGATA	900
CACAGAGAGAGAAAGAGAGGTGTCAACGCTTGGAGC	

**FIG. 64**

MNDLIRKYAKDQLETLKRIIEKSEGISILINGEDLSYPREVSLELPEYVE	
KFPPKASDVLEIDPEGENIGIDDIRTIKDFLNYSPELYTRKYVIVHDCER	100
MTQQAANAFLKALEEPPEYAVIVLNTRRWYLLPTIKSRVFRVVVNPKE	
FRDLVKEKIGDLWEELPLLERDFKTALEAYKLGAEKLSGLMESLKVLETE	200
KLLKKVLSKGLEGYLACRELLERFSKVESKEFFALFDQVTNTITGKDAFL	
LIQRLTRIILHENTWESVEDKSVSFLDSILRVKIANLNNKLTLMNILAIH	300
RERKRGVNAWS	

**FIG. 65**

ATGTCTTTCTTCAACAAGATCATACTCATAGGAAGACTCGTGAGAGATCC  
CGAAGAGAGATACACGCTCAGCGGAACTCCAGTCACCACCTTCACCATAG 100  
CGGTGGACAGGGTTCCCAGAAAGAACGCGCCGGACGACGCTCAAACGACT  
GATTTCTTCAGGATCGTCACCTTTGGAAGACTGGCAGAGTTCGCTAGAAC 200  
CTATCTCACCAAAGGAAGGCTCGTTCTCGTCGAAGGTGAAATGAGAATGA  
GAAGATGGGAAACACCCACTGGAGAAAAGAGGGTATCTCCGGAGGTTGTC 300  
GCAAACGTTGTTAGATTTCATGGACAGAAAACCTGCTGAAACAGTTAGCGA  
GACTGAAGAGGAGCTGGAAATACCGGAAGAAGACTTTTCCAGCGATACCT 400  
TCAGTGAAGATGAACCACCATT

FIG. 66

MSFFNKIILIGRLVRDPEERYTSLGTPVTTFTIAVDRVPRKNAPDDAQT  
DFFRIVTFGRLAEFARTYLTGRLVLVEGEMRMRRWETPTGEKRVSPVV 100  
ANVVRFMDRKPAETVSETEEELEIPEEDFSSDTFSEDEPPF

FIG. 67

ATGCGTGTTCCCCCGCACAACTTAGAGGCCGAAGTTGCTGTGCTCGGAAG	
CATATTGATAGATCCGTCGGTAATAAACGACGTTCTTGAAATTTTGAGCC	100
ACGAAGATTTCTATCTGAAAAACACCAACACATCTTCAGAGCGATGGAA	
GAGCTTTACGACGAAGGAAAACCGGTGGACGTGGTTTCCGTCTGTGACAA	200
GCTTCAAAGCATGGGAAAACCTCGAGGAAGTAGGTGGAGATCTGGAAGTGG	
CCCAGCTCGCTGAGGCTGTGCCAGTTCTGCACACGCACTTCACTACGCG	300
GAGATCGTCAAGGAAAAATCCATTCTGAGGAACTCATTGAGATCTCCAG	
AAAAATCTCAGAAAGTGCCTACATGGAAGAAGATGTGGAGATCCTGCTCG	400
ACAACGCAGAAAAGATGATCTTCGAGATCTCAGAGATGAAAACGACAAAA	
TCCTACGATCATCTGAGAGGCATCATGCACCGGGTGTTTGAAAACCTGGA	500
GAACTTCAGGGAAAGAGCCAACTTATAGAACCCGGTGTGCTCATAACGG	
GACTACCAACGGGATTCAAAGTCTGGACAAACAGACCACAGGGTTCCAC	600
AGCTCCGATCTGGTGATAATAGCAGCGAGACCCTCCATGGGAAAAACCTC	
CTTCGCACTCTCAATAGCGAGGAACATGGCTGTCAATTTGAAATCCCCG	700
TCGGAATATTCAGTCTCGAGATGTCCAAGGAACAGCTCGCTCAAAGACTA	
CTCAGCATGGAGTCCGGTGTGGATCTTTACAGCATCAGAACAGGATACCT	800
GGATCAGGAGAAGTGGGAAAGACTCACAATAGCGGCTTCTAAACTCTACA	
AAGCACCCATAGTTGTGGACGATGAGTCACTCCTCGATCCGCGATCGTTG	900
AGGGCAAAGCGAGAAGGATGAAAAAAGAATACGATGTAAAAGCCATTTT	
TGTCGACTATCTCCAGCTCATGCACCTGAAAGGAAGAAAAGAAAGCAGAC	1000
AGCAGGAGATATCCGAGATCTCGAGATCTCTGAAGCTCCTTGCGAGGGAA	
CTCGACATAGTGGTGATAGCGCTTTTACAGCTTTTCGAGGGCCGTAGAACA	1100
GAGAGAAGACAAAAGACCGAGGCTGAGTGACCTCAGGGAATCCGGTGCGA	
TAGAACAGGACGCAGACACAGTCATCTTCATCTACAGGGAGGAATATTAC	1200
AGGAGCAAAAAATCCAAAGAGGAAAGCAAGCTTCACGAACCTCACGAAGC	
TGAAATCATAATAGGTAAACAGAGAAACGGTCCCGTTGGAACGATCACTC	1300
TGATCTTCGACCCCAGAACGGTTACGTTCCATGAAGTCGATGTGGTGCAT	
TCA	1353

FIG. 68

MRVPPHNLEAEVAVLGSILIDPSVINDVLEILSHEDFYLLKKHQHIFRAME	
ELYDEGKPDVSVCDKLQSMGKLEEVGGDLEVAQLAEAVPSSAHALHYA	100
EIVKEKSILRKLIEISRKISESAYMEEDVEILLDNAEKMIFEISEMKTTK	
SYDHLRGIMHRVFENLENFRERANLIEPGVLITGLPTGFKSLDKQTTGFH	200
SSDLVIIAARPSMGKTSFALSIARNMAVNFEIPVGIFSLMSKEQLAQR	
LSMESGVDLYSIRTGYLDQEKWERLTIAASKLYKAPIVVDDDESLLDPRSL	300
RAKARRMKKEYDVKAIFVDYLQLMHLKGRKESRQOEISEISRSLKLLARE	
LDIVVIALSQLSRAVEQREDKRPRLSDLRESGAIEQDADTVIFIYREEYY	400
RSKKSKEESKLHEPHEAEIIIGKQRNGPVGTTITLIFDPRTVTFHEVDVH	
S	451

FIG. 69

GTGATTCCTCGAGAGGTCATCGAGGAAATAAAAGAAAAGGTTGACATCGT	
AGAGGTCATTTCCGAGTACGTGAATCTTACCCGGGTAGGTTCTCTCTACA	100
GGGCTCTCTGTCCCTTTTCATTTCAGAAACCAATCCTTCTTTCTACGTTTCA	
CCGGGTTTGAAGATATACCATTTGTTTCGGCTGCGGTGCGAGTGGAGACGT	200
CATCAAATTTCTTCAAGAAATGGAAGGGATCAGTTTCCAGGAAGCGCTGG	
AAAGACTTGCCAAAAGAGCTGGGATTGATCTTTCTCTCTACAGAACAGAA	300
GGGACTTCTGAATACGGAAAATACATTCGTTTGTACGAAGAAACGTGGAA	
AAGGTACGTCAAAGAGCTGGAGAAATCGAAAGAGGCAAAAGACTATTTAA	400
AAAGCAGAGGCTTCTCTGAAGAAGATATAGCAAAGTTTCGGCTTTGGGTAC	
GTCCCCAAGAGATCCAGCATCTCTATAGAAGTTGCAGAAGGCATGAACAT	500
AACACTGGAAGAACTTGTCTAGATACGGTATCGCGCTGAAAAAGGGTGATC	
GATTCGTTGATAGATTTCGAAGGAAGAATCGTTGTTCCAATAAAGAACGAC	600
AGTGGTCATATTGTGGCTTTTGGTGGGCGTGCTCTCGGCAACGAAGAACC	
GAAGTATTTGAACTCTCCAGAGACCAGGTATTTTTTCGAAGAAGAAGACCC	700
TTTTTCTCTTCGATGAGGCGAAAAAAGTGGCAAAAGAGGTTGGTTTTTTC	
GTCATCACCGAAGGCTACTTCGACGCGCTCGCATTTCAGAAAGGATGGAAT	800
ACCAACGGCGGTCTGCTGTTCTTGGGGCGAGTCTTTCAAGAGAGGCGATT	
TAAAACTTTCGGCGTATTCGAAAAACGTCATACTGTGTTTCGATAATGAC	900
AAAGCAGGCTTCAGAGCCACTCTCAAATCCCTCGAGGATCTCCTAGACTA	
CGAATTCAACGTGCTTGTGGCAACCCCTCTCCTTACAAAGACCCAGATG	1000
AACTCTTTCAGAAAGAAGGAGAAGGTTTCATTGAAAAAGATGCTGAAAAAC	
TCGCGTTCGTTTCGAATATTTTCTGGTGACGGCTGGTGAGGTCTTCTTTGA	1100
CAGGAACAGCCCCGCGGGTGTGAGATCCTACCTTTCTTTCTCAAAGGTT	
GGGTCCAAAAGATGAGAAGGAAAGGATATTTGAAACACATAGAAAATCTC	1200
GTGAATGAGGTTTCATCTTCTCTCCAGATACCAGAAAACCAGATTTTGAA	
CTTTTTTTGAAAGCGACAGGTCTAACACTATGCCTGTTTCATGAGACCAAGT	1300
CGTCAAAGGTTTACGATGAGGGGAGAGGACTGGCTTATTTGTTTTTTGAAC	
TACGAGGATTTGAGGGAAAAGATTCTGGAACCTGGACTTAGAGGTACTGGA	1400
AGATAAAAACGCGAGGGAGTTTTTCAAGAGAGTCTCACTGGGAGAAGATT	
TGAACAAAGTCATAGAAAACCTTCCCAAAGAGCTGAAAGACTGGATTTTTT	1500
GAGACAATAGAAAGCATTCCTCCTCCAAAGGATCCCGAGAAATTCCTCGG	
TGACCTCTCCGAAAAGTTGAAAATCCGACGGATAGAGAGACGTATCGCAG	1600
AAATAGATGATATGATAAAGAAAGCTTCAAACGATGAAGAAAGGCGTCTT	
CTTCTCTCTATGAAAGTGGATCTCCTCAGAAAAATAAAGAGGAGG	1695

FIG. 70

MIPREVIEEIKEKVDIVEVISEYVNLTRVGSSYRALCPFHSETNPSFYVH	
PGLKIYHCFGCGASGDVIKFLQEMEGISFQEALERLAKRAGIDLSLYRTE	100
GTSEYGKYIRLYEETWKRYVKELEKSKEAKDYLSRGFSEEDIAKFGFGY	
VPKRSSISIEVAEGMNITLEELVRYGIALKKGDRFVDRFEGRIVVPIKND	200
SGHIVAFGGRALGNEEPKYLNSPETRYFSKKKTLFLFDEAKKVAKEVGFF	
VITEGYFDALAFRKDGIPTAVAVLGASLSREAILKLSAYSKNVILCFDND	300
KAGFRATLKSLEDLLDYEFNVLVATPSPYKDPDELFOKEGEGSLKKMLKN	
SRSFEYFLVTAGEVFFDRNSPAGVRSYLSFLKGWVQKMRRKGYLKHIENL	400
VNEVSSSLQIPENQILNFFESDRSNTMPVHETKSSKVYDEGRGLAYLFLN	
YEDLREKILELDLEVLEDKNAREFFKRVS LGEDLNKVIENFPKELKDWIF	500
ETIESIPPPKDPEKFLGDLSEKLKIRRIERRIAEIDDMIKKASNDEERRL	
LLSMKVDLLRKIKRR	565

FIG. 71

ATGGCTCTACACCCGGCTCACCCTGGGGCAATAATCGGGCACGAGGCCGT	
TCTCGCCCTCCTTCCCCGCCTCACCGCCAGACCCTGCTCTTCTCCGGCC	100
CCGAGGGGGTGGGGCGGCGCACCGTGGCCCGCTGGTACGCCTGGGGGCTC	
AACCGCGGCTTCCCCCGCCCTCCCTGGGGGAGCACCCGGACGTCCTCGA	200
GGTGGGGCCCAAGGCCCGGGACCTCCGGGGCCGGGCCGAGGTGCGGCTGG	
AGGAGGTGGCGCCCTCTTGGAGTGGTGCTCCAGCCACCCCGGGAGCGG	300
GTGAAGGTGGCCATCCTGGACTCGGCCACCTCCTCACCAGAGCCGCCGC	
CAACGCCCTCCTCAAGCTCCTGGAGGAGCCCCCTTCTACGCCCGCATCG	400
TCCTCATCGCCCCAAGCCGCGCCACCCTCCTCCCCACCCTGGCCTCCCGG	
GCCACGGAGGTGGCATTGCCCCCGTGCCCGAGGAGGCCCTGCGCGCCCT	500
CACCCAGGACCCGGAGCTCCTCCGCTACGCCGCGGGGGCCCCGGGCC	
TCCTTAGGGCCCTCCAGGACCCGGAGGGGTACCGGGCCCGCATGGCCAGG	600
GCGCAAAGGGTCTTGAAAGCCCCGCCCTGGAGCGCCTCGCTTTGCTTCG	
GGAGCTTTTGGCCGAGGAGGAGGGGGTCCACGCCCTCCACGCCGTCTAA	700
AGCGCCCGGAGCACCTCCTTGCCCTGGAGCGGGCGCGGGAGGCCCTGGAG	
GGGTACGTGAGCCCCGAGCTGGTCCTCGCCCGGCTGGCCTTAGACTTAGA	800
GACA	

FIG. 72

MALHPAHPGAIIGHEAVLALLPRLTAQTLLFSGPEGVGRRTVARWYAWGL	
NRGFPPPSLGEHPDVLEVGPKARDLRGRAEVRLEEVAPLLEWCSSHPRER	100
VKVAILDSAHLLTEAAANALLKLEEPSYARIVLIAPSRATLLPTLASR	
ATEVAFAPVPEEALRALTQDPELLRYAAGAPGRLLRALQDPEGYRARMAR	200
AQRVLKAPPLERLALLRELLAEEEGVHALHAVLKRPEHLLALERAREALE	
GYVSPELVLARLALDLET	268

FIG. 73



ATGCTGGACCTGAGGGAGGTGGGGGAGGCGGAGTGGAAGGCCCTAAAGCC	
CCTTTTGGAAAGCGTGCCCGAGGGCGTCCCCGTCCTCCTCCTGGACCCTA	100
AGCCAAGCCCCCTCCCGGGCGGCCTTCTACCGGAACCGGGAAAGGCGGGAC	
TTCCCCACCCCCAAGGGGAAGGACCTGGTGCGGCACCTGGAAAACCGGGC	200
CAAGCGCCTGGGGCTCAGGCTCCCGGGCGGGGTGGCC CAGTACCTGGCCT	
CCCTGGAGGGGGACCTCGAGGCCCTGGAGCGGGAGCTGGAGAAGCTTGCC	300
CTCCTCTCCCCACCCCTCACCTTGAGAAAGGTGGAGAAGGTGGTGGCCCT	
GAGGCCCCCCTCACGGGCTTTGACCTGGTGCGCTCCGTCCTGGAGAAGG	400
ACCCCAAGGAGGCCCTCCTGCGCCTAGGCGGCCTCAAGGAGGAGGGGGAG	
GAGCCCCTCAGGCTCCTCGGGGCCCTCTCCTGGCAGTTCGCCCTCCTCGC	500
CCGGGCCTTCTTCTCCTCCGGGAAAACCCCAAGGAGGAGGACC	
TCGCCCCGCTCGAGGCCACCCCTACGCCGCCCGCCGCGCCCTGGAGGCG	600
GCGAAGCGCCTCACGGAAGAGGCCCTCAAGGAGGCCCTGGACGCCCTCAT	
GGAGGCGGAAAAGAGGGCCAAGGGGGGGAAAGACCCGTGGCTCGCCCTGG	700
AGGCGGCGGTCTCCGCCTCGCCCCGTTGA	

**FIG. 74**

MVIAFTGDPFLAREALLEEARLRGLSRFTEPTPEALAQALAPGLFGGGGA	
MLDLREVGEAEWKALKPLLESVPEGVPVLLLDPKPSPSRAAFYRNRERRD	100
FPTPKGKDLVRHLENRAKRLGLRLPGGVAQYLASLEGDLEALERELEKLA	
LLSPPLTLEKVEKVVALRPPLTGFDLVRVLEKDPKEALLRLGGLKEEGE	200
EPLRLLGALSWQFALLARAFFLLRENPRPKEEDLARLEAHPYAARRALEA	
AKRLTEEALKEALDALMEAEKRAKGGKDPWLALEAAVLRRLAR	292

**FIG. 75**

ATGGCTCGAGGCCTGAACCGCGTTTTTCCTCATCGGCGCCCTCGCCACCCG	
GCCGGACATGCGCTACACCCCGGCGGGGCTCGCCATTTTGGACCTGACCC	100
TCGCCGGTCAGGACCTGCTTCTTTCCGATAACGGGGGGGAACCGGAGGTG	
TCCTGGTACCACCGGGTGAGGCTCTTAGGCCGCCAGGCGGAGATGTGGGG	200
CGACCTCTTGACCAAGGGCAGCTCGTCTTCGTGGAGGGCCGCCTGGAGT	
ACCGCCAGTGGGAAAGGGAGGGGGAGAAGCGGAGCGAGCTCCAGATCCGG	300
GCCGACTTCCGGACCCCCCTGGACGACCGGGGGGAAGAAGCGGGCGGAGGAC	
AGCCGGGGCCAGCCCAGGCTCCGCGCCGCCCTGAACCAGGTCTTCCTCAT	400
GGGCAACCTGACCCGGGACCCGGAACCTCCGCTACACCCCCCAGGGGCACCG	
CGGTGGCCCCGGCTGGGCCTGGCGGTGAACGAGCGCCGC CAGGGGGCGGAG	500
GAGCGCACCCACTTCGTGGAGGTT CAGGCCTGGCGCGACCTGGCGGAGTG	
GGCCGCCGAGCTGAGGAAGGGCGACGGCCTTTTCGTGATCGGCAGGTTGG	600
TGAACGACTCCTGGACCAGCTCCAGCGGCGAGCGGCGCTTCCAGACCCGT	
GTGGAGGCCCTCAGGCTGGAGCGCCCCACCCGTGGACCTGCCCAGGCCTG	700
CCCAGGCCGGCGGAACAGGTCCCGCGAAGTCCAGACGGGTGGGGTGGACA	
TTGACGAAGGCTTGGAAGACTTTCCGCCGGAGGAGGATTTGCCGTTTTGA	800
GCACGAA	

**FIG. 76**

MARGLNRVFLIGALATRPDMRYTPAGLAILDLTLAGQDLLLSDNNGEPEV	
SWYHRVRL LGRQAEMWGDLLDQGQLVFVEGRLEYRQWEREGEKRSELQIR	100
ADFLDPLDDRGGKKRAEDSRGQPLRAALNQVFLMGNLTRDPELRYTPQGT	
AVARLGLAVNERRQGAERTHFVEVQAWRDLAEWAAELRKGDGLFVIGRL	200
VNDSWTSSSGERRFQTRVEALRLERPTRGPAQACPGRNRNRSREVQTGGVD	
IDEGLEDFPPEEDLPF	266

**FIG. 77**

AATTCCGACATTTCAATTGAATCGTTTATTCCGCTTGAAAAAGAAGGCAA	
GTTGCTCGTTGATGTGAAAAGACCGGGGAGCATCGTACTGCAGGCGCGCT	100
TTTTCTCTGAAATCGTGAAAAAACTGCCGCAACAAACGGTGGAAATCGAA	
ACGGAAGACAACCTTTTGTACGATCATCCGCTCGGGGCACTCAGAATTCCG	200
CCTCAATGGGCTAAACGCCGACGAATATCCGCGCCTGCCGCAAATTGAAG	
AAGAAAACGTGTTTCAAATCCCGGCTGATTTATTGAAAACCGTGATTCGG	300
CAAACGGTGTTTCGCCGTTTCTACATCGGAAACGCGCCCAATCTTGACAGG	
TGTCAACTGGAAAGTTGAACATGGCGAGCTTGTCTGCACAGCGACCGACA	400
GTCATCGCTTAGCCATGCGCAAAGTGAAAATTGAGTCGGAAAATGAAGTA	
TCATACAACGTCGTCATCCCTGGAAAAAGTCTTAATGAGCTCAGCAAAAT	500
TTTGGATGACGGCAACCACCCGGTGGACATCGTCATGACAGCCAATCAAG	
TGCTATTTAAGGCCGAGCACCTTCTCTTCTTTTCCCGGCTGCTTGACGGC	600
AACTATCCGGAGACGGCCCGCTTGATTCCAACAGAAAGCAAAACGACCAT	
GATCGTCAATGCAAAAGAGTTTCTGCAGGCAATCGACCGAGCGTCCTTGC	700
TTGCTCGAGAAGGAAGGAACAACGTTGTGAAACTGACGACGCTTCCTGGA	
GGAATGCTCGAAATTTCTTCGATTTCTCCGAGATCGGGAAAGTGACGGAG	800
CAGCTGCAAACGGAGTCTCTTGAAGGGGAAGAGTTGAACATTTTCGTTTCA	
CGCGAAATATATGATGGACGCGTTGCGGGCGCTTGATGGAACAGACATTT	900
CAAATCAGCTTCACTGGGGCCATGCGGCCGTTCTGTGCGCCCGCTTCA	
ACCGATTCGATGCTTCAGCTCATTTTGCCGGTGAGAACATAT	992

FIG. 78

NSDISIIESFIPLEKEGKLLVDVKRPGSIVLQARFFSEIVKKLPQQTVEI	
ETEDNFLTIIRSGHSEFRLNGLNADEYPRLPQIEEENVFQIPADLLKTVI	100
RQTVFAVSTSETRPILTGVDNWKVEHGELVCTATDSHRLAMRKVKIIESEN	
EVSYNVIPGKSLNELSKIILDDGNHPVDIVMTANQVLFKAEHLLFFSRL	200
LDGNYPETARLIPTESKTTMIVNAKEFLQAIDRASLLAREGRNNVVKLTT	
LPGGMLEISSISPEIGKVTEQLQTESLEGEELNISFSAKYMMDALRALDG	300
TDIQISFTGAMRPFLRLPLHTDSMLQLILPVRTY	

FIG. 79

ATGATTAACCGCGTCATTTTGGTCGGCAGGTTAACGAGAGATCCGGAGTT	
GCGTTACACTCCAAGCGGAGTGGCTGTTGCCACGTTTACGCTCGCGGTCA	100
ACCGTCCGTTTACAAATCAGCAGGGCGAGCGGGAAACGGATTTTATTCAA	
TGTGTCGTTTGGCGCCGCCAGGCGGAAAACGTCGCCAACTTTTTTGAAAAA	200
GGGGAGCTTGGCTGGTGTTCGATGGCCGACTGCAAACCCGCAGCTATGAAA	
ATCAAGAAGGTCGGCGTGTGTACGTGACGGAAGTGGTGGCTGATAGCGTC	300
CAATTTCTTGAGCCGAAAGGAACGAGCGAGCAGCGAGGGGCGACAGCAGG	
CGGCTACTATGGGGATCCATTCCCATTCTGGGCAAGATCAGAACCACCAAT	400
ATCCGAACGAAAAAGGGTTTGGCCGCATCGATGACGATCCTTTCGCCAAT	
GACGGCCAGCCGATCGATATTTCTGATGATGATTTGCCGTTT	492

**FIG. 80**

MINRVILVGRLTRDPELRYTPSGVAVATFTLAVNRPFTNQSYENQEGRRV	
YVTEVVADSVQFLEPKGTSEQRGATAGGYQGERETDFIQCVVWRRQAEN	100
VANFLKKGSLAGVDGRLQTRGDPFPFGQDQNHQYPNEKGFGRIDDDPFAN	
DGQPIDISDDDLPF	164

**FIG. 81**

ATGCTGGAACGCGTATGGGGAAACATTGAAAAACGGCGTTTTTCTCCCCT	
TTATTTATTATACGGCAATGAGCCGTTTTTATTAACGGAAACGTATGAGC	100
GATTGGTGAACGCAGCGCTTGGCCCCGAGGAGCGGGAGTGGAACCTGGCT	
GTGTACGACTGCGAGGAAACGCCGATCGAGGCGGCGCTTGAGGAGGCCGA	200
GACGGTGCCGTTTTTCGGCGAGCGGCGTGTCATTCTCATCAAGCATCCAT	
ATTTTTTTTACGTCTGAAAAAGAGAAGGAGATCGAACATGATTTGGCGAAG	300
CTGGAGGCGTACTTGAAGGCGCCGTCGCCGTTTTTCGATCGTCGTCTTTTT	
CGCGCCGTACGAGAAGCTTGATGAGCGAAAAAAAATTACGAAGCTCGCCA	400
AAGAGCAAAGCGAAGTCGTCATCGCCGCCCGCTCGCCGAAGCGGAGCTG	
CGTGCCTGGGTGCGGCGCCGCATCGAGAGCCAAGGGGCGCAAGCAAGCGA	500
CGAGGCGATTGATGTCCTGTTGCGGCGGGCCGGGACGCAGCTTTCGCCT	
TGGCGAATGAAATCGATAAATTGGCCCTGTTTGCCGGATCGGGCGGAACC	600
ATCGAGGCGGCGGCGGTTGAGCGGCTTGTGCCCCGCACGCCGGAAGAAA	
CGTATTTGTGCTTGTGCGAGCAAGTGGCGAAGCGCGACATTCCAGCAGCGT	700
TGCAGACGTTTTTATGATCTGCTTGAAAACAATGAAGAGCCGATCAAATT	
TTGGCGTTGCTCGCCGCCCATTTCCGCTTGCTTTCGCAAGTGAAATGGCT	800
TGCCTCCTTAGGCTACGGACAGGCGCAAATTGCTGCGGCGCTCAAGGTGC	
ACCCGTTCCGCGTCAAGCTCGCTCTTGCTCAAGCGGCCCGCTTCGCTGAC	900
GGAGAGCTTGCTGAGGCGATCAACGAGCTCGCTGACGCCGATTACGAAGT	
GAAAAGCGGGGCGGTCGATCGCCGGTTGGCCGTTGAGCTGCTTCTGATGC	1000
GCTGGGGCGCCCCGCCCGGCGCAAGCGGGGCGCCACGGCCGGCGG	

**FIG. 82**

MLERVWGNIEKRRFSPLYLLYGNEPFLLTETYERLVNAALGPEEREWNLA	
VYDCEETPIEAALAEAETVPFFGERRVILIKHPYFFTSEKEKEIEHDLAK	100
LEAYLKAPSPFSIVVFFAPYEKLDERKKITKLAKEQSEVVIAAPLAEDEL	
RAWVRRRIESQGAQASDEAIDVLLRRAGTQLSALANEIDKLALFAGSGGT	200
IEAAAVERLVARTPEENVFVLVEQVAKRDI PAALQTFYDLLENNEEPIKI	
LALLAAHFRLLSQVKWLASLGYGQAQIAAALKVHPFRVKLALAQAARFAD	300
GELAEAINELADADYEVKSGAVDRRLAVELLMLRWGARPAQAGRHGR	

**FIG. 83**



ATGCGATGGGAACAGCTAGCGAAACGCCAGCCGGTGGTGGCGAAAATGCT	
GCAAAGCGGCTTGGAAAAAGGGCGGATTTCTCATGCGTACTTGTTTGAGG	100
GGCAGCGGGGGACGGGCAAAAAAGCGGCCAGTTTGTTGTTGGCGAAACGT	
TTGTTTTGTCTGTCCCCAATCGGAGTTTCCCCGTGTCTAGAGTGCCGCAA	200
CTGCCGGCGCATCGACTCCGGCAACCACCCTGACGTCCGGGTGATCGGCC	
CAGATGGAGGATCAATCAAAAAGGAACAAATCGAATGGCTGCAGCAAGAG	300
TTCTCGAAAACAGCGGTCTGAGTCGGATAAAAAAATGTACATCGTTGAGCA	
CGCCGATCAAATGACGACAAGCGCTGCCAACAGCCTTCTGAAATTTTGG	400
AAGAGCCGCATCCGGGGACGGTGGCGGTATTGCTGACTGAGCAATACCAC	
CGCCTGCTAGGGACGATCGTTTCCCGCTGTCAAGTGCTTTCGTTCCGGCC	500
GTTGCCGCCGGCAGAGCTCGCCCAGGGACTTGTCGAGGAGCACGTGCCGT	
TGCCGTTGGCGCTGTTGGCTGCCCATTTGACAAACAGCTTCGAGGAAGCA	600
CTGGCGCTTGCCAAAGATAGTTGGTTTGCCGAGGCGCGAACATTAGTGCT	
ACAATGGTATGAGATGCTGGGCAAGCCGGAGCTGCAGCTTTTGTTTTCA	700
TCCACGACCGCTTGTTTCCGCATTTTTTGGAAAGCCATCAGCTTGACCTT	
GGACTTG	757

**FIG. 84**

MRWEQLAKRQPVVAKMLQSGLEKGRISHAYLFEGQRTGKKAASLLAKR	
LFCLSPIGVSPCLECRNCRRIDSGNHDPVRVIGPDGGS IKKEQIEWLQQE	100
FSKTAVESDKKMYIVEHADQMTTSAANSLKFLLEPHPGTVAVLLTEQYH	
RLLGTVSRQCQLSFRPLPPAELAQGLVEEHVPLPLALLAAHLTNSFEEA	200
LALAKDSWFAEARTLVLQWYEMLGKPELQLLFFIHDRLFPHFLESHQLDL	
GL	252

**FIG. 85**

GTGGCATACCAAGCGTTATATCGCGTGTTTCGGCCGCAGCGCTTTGCGGA	
CATGGTCGGCCAAGAACACGTGACCAAGACGTTGCAAAGCGCCCTGCTTC	100
AACATAAAATATCGCACGCTTACTTATTTTCCGGCCCGCGCGGTACAGGA	
AAAACGAGCGCAGCGAAAATTTTCGCCAAGGCGGTCAACTGTGAACAGGC	200
GCCAGCGGCGGAGCCATGCAATGAGTGTCCAGCTTGCCTCGGCATTACGA	
ATGGAACGGTTCCTCGATGTGCTGGAAATTGACGCTGCTTCCAACAACCGC	300
GTCGATGAAATTCGTGATATCCGTGAGAAGGTGAAATTTGCGCCAACGTC	
GGCCCGCTACAAAGTGTATATCATCGACGAGGTGCATATGCTGTCGATCG	400
GTGCGTTTAAACGCGCTGTTGAAAACGTTGGAGGAGCCGCCGAAACACGTC	
ATTTTCATTTTGGCCACGACCGAGCCGCACAAAATTCCGGCGACGATCAT	500
TTCCCGCTGCCAACGGTTCGATTTTCGCCGCATCCCGCTTCAGGCGATCG	
TTTCACGGCTAAAGTACGTGCAAGCGCCCAAGGTGTGAGGCGTCAGAT	600
GAGGCATTGTCCGCCATCGCCCGTGCTGCAGACGGGGGGATGCGCGATGC	
GCTCAGCTTGCTTGATCAAGCCATTTCTGTTTCAGCGACGGGAAACTTCGGC	700
TCGACGACGTGCTGGCGATGACCGGGGCTGCATCATTTGCCGCCTTATCG	
AGCTTCATCGAAGCCATCCACCGCAAAGATACAGCGGCGGTTCTTCAGCA	800
CTTGGAACGATGATGGCGCAAGGGAAAGATCCGCATCGTTTGGTTGAAG	
ACTTGATTTTGTACTATCGCGATTTATTGCTGTACAAAACCGCTCCCTAT	900
GTGGAGGGAGCGATTCAAATTGCTGTCGTTGACGAAGCGTTCACTTCACT	
GTCGGAAATGATTCCGGTTTCCAATTTATACGAGGCCATCGAGTTGCTGA	1000
ACAAAAGCCAGCAAGAGATGAAGTGGACAAACCACCCGCGCCTTCTGTTG	
GAAGTGGCGCTTGTGAAACTTTGCCATCCATCAGCCGCCGCCCGTCGCT	1100
GTCCGGCTTCCGAGTTGGAACCGTTGATAAAGCGGATTGAAACGCTGGAGG	
CGGAATTGCGGCGCCTGAAGGAACAACCGCCTGCCCCCTCCGTCGACCGCC	1200
GCGCCGGTGAAAAAACTGTCCAAACCGATGAAAACGGGGGGGATATAAAGC	
CCCGGTTGGCCGCATTTACGAGCTGTTGAAACAGGCGACGCATGAAGATT	1300
TAGCTTTGGTGAAAGGATGCTGGGCGGATGTGCTCGACACGTTGAAACGG	
CAGCATAAAGTGTGCGACGCTGCCTTGCTGCAAGAGAGCGAGCCGGTTGC	1400
AGCGAGCGCCTCAGCGTTTGTATTAAAATTCAAATACGAAATCCACTGCA	
AAATGGCGACCGATCCCAAGTTCGGTCAAAGAAAACGTCGAAGCGATT	1500
TTGTTTGAGCTGACAAACCGCCGCTTTGAAATGGTAGCCATTCCGGAGGG	
AGAATGGGGAAAAATAAGAGAAGAGTTCATCCGCAATAAGGACGCCATGG	1600
TGGAAAAAAGCGAAGAAGATCCGTTAATCGCCGAAGCGAAGCGGCTGTTT	
GGCGAAGAGCTGATCGAAATTAAAGAA	1677

FIG. 86

VAYQALYRVFRPQRFADMVGQEHVTKTLQSALLQHKISHAYLFSGPRGTG	
KTSAAKIFAKAVNCEQAPAAEPCNECPACLGITNGTVPDVLEIDAASNNR	100
VDEIRDIREKVKFAPTSARYKVYIIDEVHMLSIGAFNALLKTLEPPKHV	
IFILATTEPHKIPATIIISRCQRFDFRRIPLOAIVSRLKYVASAQGVEASD	200
EALSAIARAADGGMRDALSLLDQAI SFSDGKLRLDDVLAMTGAASFAALS	
SFIEAIHRKDTAAVLQHLETMMAQGKDPHRLVEDLILYYRDLLLYKTAPY	300
VEGAIQIAVVDEAFTSLSEMI PVSNLYEAI ELLNKSQQEMKWTNHPRLLL	
EVALVKLCHPSAAAPSL SASELEPLIKRIETLEAELRRLKEOPPAPPSTA	400
APVKKLSKPMKTGGYKAPVGRIYELLKQATHEDLALVKGCWADVLDTLKR	
QHKVSHAALLQESEPVAASASAFVLKF KYEIHCKMATDPTSSVKENVEAI	500
LFELTNRRFEMVAIPEGEWGKIREEFIRNKDAMVEKSEEDPLIAEAKRLF	
GEELIEIKE	559

**FIG. 87**

ATGGTGACAAAAGAGCAAAAAGAGCGGTTTCTCATCCTGCTTGAGCAGCT	
GAAGATGACGTCGGACGAATGGATGCCGCATTTTCGTGAGGCAGCCATTC	100
GCAAAGTCGTGATCGATAAAGAGGAGAAAAGCTGGCATTTTTATTTTCAG	
TTCGACAACGTGCTGCCGGTTCATGTATACAAAACGTTTGCCGATCGGCT	200
GCAGACGGCGTTCCGCCATATCGCCGCCGTCCGCCATACGATGGAGGTCG	
AAGCGCCGCGCGTAACCTGAGGCGGATGTGCAGGCGTATTGGCCGCTTTGC	300
CTTGCCGAGCTGCAAGAAGGCATGTCGCCGCTTGTCGATTGGCTCAGCCG	
GCAGACGCCTGAGCTGAAAGGAAACAAGCTGCTTGTCGTTGCCCCGCCATG	400
AAGCGGAAGCGCTGGCGATCAAACGGCGGTTCCGCCAAAAAATCGCTGAT	
GTGTACGCTTCGTTTGGGTTTCCCCCCTTCAGCTTGACGTCAGCGTCGA	500
GCCGTCCAAGCAAGAAATGGAACAGTTTTTGGCGCAAAAACAGCAAGAGG	
ACGAAGAGCGAGCGCTTGCTGTACTGACCGATTTAGCGAGGGAAGAAGAA	600
AAGGCCGCGTCTGCGCCGCCGTCCGGTCCGCTTGTCATCGGCTATCCGAT	
CCGCGACGAGGAGCCGGTGCGGCGGCTTGAAACGATCGTCGAAGAAGAGC	700
GGCGCGTCGTTGTGCAAGGCTATGTATTTGACGCCGAAGTGAGCGAATTA	
AAAAGCGGCCGACGCTGTTGACCATGAAAATCACAGATTACACGAAGTC	800
GATTTTAGTCAAAATGTTCTCGCGCGACAAAGAGGACGCCGAGCTTATGA	
GCGGCGTCAAAAAGGCATGTGGGTGAAAGTGCGCGGCAGCGTGCAAAAC	900
GATACGTTTCGTCCGTGATTTGGTCATCATCGCCAACGATTTGAACGAAAT	
CGCCGCAAACGAACGGCAAGATACGGCGCCGGAAGGGGAAAAGAGGGTCG	1000
AGCTCCATTTGCATACCCCGATGAGCCAAATGGACGCGGTACCTCGGTG	
ACAAAACCTCATTGAGCAAGCGAAAAAATGGGGGCATCCGGCGATCGCCGT	1100
CACCGACCATGCCGTTGTTTCAGTCGTTTCCGGAGGCCTACAGCGCGGCGA	
AAAACACGGCATGAAGGTCATTTACGGCCTTGAGGCGAACATCGTCGAC	1200
GATGGCGTGCCGATCGCCTACAATGAGACGCACCGCCGTCTTTCGGAGGA	
AACGTACGTCGTCTTTGACGTCGAGACGACGGGCCTGTCGGCTGTGTACA	1300
ATACGATCATTGAGCTGGCGGCGGTGAAAGTGAAAGACGGCGAGATCATC	
GACCGATTCATGTCGTTTGCCAACCCTGGACATCCGTTGTCGGTGACAAC	1400
GATGGAGCTGACTGGGATCACCGATGAGATGGTGAAAGACGCCCCGAAGC	
CGGACGAGGTGCTAGCCCGTTTTTGTGACTGGGCGGCGATGCGACGCTT	1500
GTTGCCCAACGCCAGCTTTGACATCGGTTTTTTTAAACGCGGGCCTCGC	
TCGCATGGGGCGCGGCAAAATCGCGAATCCAGTCATCGATACGCTCGAGC	1600
TGGCCCGTTTTTTTATACCCGGATTTGAAAAACCATCGGCTCAATACATTG	
TGCAAAAAATTTGACATTGAATTGACGCAGCATCACCGCGCCATCTACGA	1700
CGCGGAGGCGACCGGGCATTGCTTATGCGGCTGTTGAAGGAAGCGGAAG	
AGCGCGGCATACTGTTTCATGACGAATTAAACAGCCGCACGCACAGCGAA	1800
GCGTCCTATCGGCTTGCGCGCCCGTTCCATGTGACGCTGTTGGCGCAAAA	
CGAGACTGGATTGAAAAATTTGTTCAAGCTTGTGTCATTGTCGCACATTC	1900
AATATTTTCACCGTGTGCCGCGCATCCCGCGCTCCGTGCTCGTCAAGCAC	
CGCGACGGCCTGCTTGTCGGCTCGGGCTGCGACAAAGGAGAGCTGTTTGA	2000
CAACTTGATCCAAAAGGCGCCGGAAGAAGTCGAAGACATCGCCCGTTTTT	
ACGATTTTCTTGAAGTGCATCCGCCGGACGTGTACAAGCCGCTCATCGAG	2100
ATGGATTATGTGAAAGACGAAGAGATGATCAAAAACATCATCCGCAGCAT	
CGTCGCCCTTGGTGAGAAGCTTGACATCCCGGTTGTCGCCACTGGCAACG	2200

FIG. 88A

TCCATTACTTGAACCCAGAAGATAAAATTTACCGGAAAATCTTAATCCAT  
TCGCAAGGCGGGGCGAATCCGCTCAACCGCCATGAACTGCCGGATGTATA 2300  
TTTCCGTACGACGAATGAAATGCTTGACTGCTTCTCGTTTTTAGGGCCGG  
AAAAAGCGAAGGAAATCGTCGTTGACAACACGCAAAAAATCGCTTCGTTA 2400  
ATCGGCGATGTCAAGCCGATCAAAGATGAGCTGTATACGCCGCGCATTGA  
AGGGGCGGACGAGGAAATCAGGGAAATGAGCTACCGGCGGGCGAAGGAAA 2500  
TTTACGGCGACCCGTTGCCGAAACTTGTGGAAGAGCGGCTTGAGAAGGAG  
CTAAAAGCATCATCGGCCATGGCTTTGCCGTCATTTATTTGATCTCGCA 2600  
CAAGCTTGTGAAAAAATCGCTCGATGACGGCTACCTTGTGGGTTCGCGCG  
GATCGGTTCGGCTCGTCGTTTGTGCGGACGATGACGGAAATCACCGAGGTC 2700  
AATCCGCTGCCGCCGCATTACGTTTGCCCGAACTGCAAGCATTTCGGAGTT  
CTTTAACGACGGTTCAGTCGGCTCAGGGTTTGATTTGCCGGATAAAAACT 2800  
GCCCCGCGATGTGGGACGAAATACAAGAAAGACGGGCACGACATCCCGTTT  
GAGACGTTTCTCGGCTTTAAAGGCGACAAAGTGCCGGATATCGACTTGAA 2900  
CTTTTCCGGCGAATACCAGCCGCGCGCCCACTATAAGAAAGTGCTGT  
TTGGCGAAGACAACGTCTACCGCGCCGGGACGATTGGCACGGTCGCTGAC 3000  
AAACGGCGTACGGATTTGTCAAAGCGTATGCGAGCGACCATAACTTAGA  
GCTGCGCGGCGCGGAAATCGACGGCTCGCGGCTGGCTGCACCGGGGTGAA 3100  
GCGGACGACCGGGCAGCATCCGGGCGGCATCATCGTCGTCCCGGATTATA  
TGGAAATTTACGATTTTACGCCGATTCAATATCCGGCCGATGACACGTCC 3200  
TCTGAATGGCGGACGACCCATTTGACTTCCATTTCGATCCACGACAATTT  
GTTGAAGCTCGATATTCTCGGGCACGACGATCCGACGGTCATTTCGCATGC 3300  
TGCAAGATTTAAGCGGCATCGATCCGAAAACGATCCCGACCGACGACCCG  
GATGTGATGGGCATTTTCAGCAGCACCGAGCCGCTTGGCGTTACGCCGGA 3400  
GCAAATCATGTGCAATGTGCGGCACGATCGGCATTCCGGAGTTTGGCACGC  
GCTTCGTTTCGGCAAATGTTGGAAGAGACAAGGCCAAAAACGTTTTCCGAA 3500  
CTCGTGCAAATTTCCGGCTTGTGCGCACGGCACCGATGTGTGGCTCGGCAA  
CGCGCAAGAGCTCATTCAAACGGCACGTGTACGTTATCGGAAGTCATCG 3600  
GCTGCCGCGACGACATTATGGTCTATTTGATTTACCGCGGGCTCGAGCCG  
TCGCTCGCTTTTAAATCATGGAATCCGTGCGCAAAGGAAAAGGCTTAAC 3700  
GCCGGAGTTTGAAGCAGAAATGCGCAAACATGACGTGCCGGAGTGGTACA  
TCGATTCATGCAAAAAAATCAAGTACATGTTCCCGAAAGCGCACGCCGCC 3800  
GCCTACGTGTTAATGGCGGTGCGCATCGCCTACTTTAAGGTGCACCATCC  
GCTTTTGTATTACGCGTCGTACTTTACGGTGCGGGCGGAGGACTTTGACC 3900  
TTGACGCCATGATCAAAGGATCACCCGCCATTTCGCAAGCGGATTGAGGAA  
ATCAACGCCAAAGGCATTCAGGCGACGGCGAAAGAAAAAAGCTTGCTCAC 4000  
GGTTCTTGAGGTGGCCTTAGAGATGTGCGAGCGCGGCTTTTCCTTTAAA  
ATATCGATTTGTACCGCTCGCAGGCGACGGAATTCGTCATTGACGGCAAT 4100  
TCTCTCATTCGCGCGTTCAACGCCATTCCGGGGCTTGGGACGAACGTGGC  
GCAGGCGATCGTGCGCGCCCGCGAGGAAGGCGAGTTTTTGTGCAAGGAGG 4200  
ATTTGCAACAGCGCGGCAAATTGTGCAAAACGCTGCTCGAGTATCTAGAA  
AGCCGCGGCTGCCTTGACTCGCTTCCAGACCATAACCAGCTGTCGCTGTT 4300  
T

FIG. 88B



MVTKEQKERFLILLEQLKMTSDEWMPHFREAAIRKVVIDKEEKSWHIFYQ	
FDNVLPVHVYKTFADRLQTAFRHIAAVRHTMEVEAPRVTEADVQAYWPLC	100
LAELQEGMSPLVDWLSRQTPELKGNKLLVVARHEAEALAIKRRFAKKIAD	
VYASFGFPPLQLDVSVEPSKQEMEQFLAQKQOQDEERALAVLTDLAREEE	200
KAASAPPSGPLVIGYPIRDEEPVRRLETIVEEERRVVVQGYVFDAEVSEL	
KSGRTLTMKITDYTNSILVKMFSDKEDAEMSGVKKGMWVKVRGSVQN	300
DTFVRDLVIIANDLNEIAANERQDTAPEGEKRVELHLHTPMSQMDAVTSV	
TKLIEQAKKWGHPAIAVTDHAVVQSFPEAYSAAKKHGMKVIYGLEANIVD	400
DGVPIAYNETHRRLSEETYVVFVETTGLSAVYNTIIELAAVKVKDGEII	
DRFMSFANPGHPLSVTTMELTGITDEMVKDAPKPDEVLARFVDWAGDATL	500
VAHNASFDIGFLNAGLARMGRGKIANPVIDTLELARFLYPDLKNHRLNTL	
CKKFDIELTQHHRAIYDAEATGHLLMRLLEAEERGILFHDELNSRTHSE	600
ASYRLARPFHVTLTLLAQNETGLKNLFKLVSLSHIQYFHRVPRI PRSVLVKH	
RDGLLVGSGCDKGELFDNLIQKAPEEVEDIARFYDFLEVHPPDVYKPLIE	700
MDYVKDEEMIKNIIRSIVALGEKLDIPVVATGNVHYLNPEDKIYRKILIH	
SQGGANPLNRHELDPVYFRTTNEMLDCFSFLGPEKAKEIVVDNTQKIASL	800
IGDVKPIKDELYTPRIEGADEEIREMSYRRAKEIYGDPLPKLVEERLEKE	
LKSIIGHGFAVIYLI SHKLVKKSLLDDGYLVGSRGSGVSSFVATMTEITEV	900
NPLPPHYVCPNCKHSEFFNDGSGVSGFDLPDKNCPRCGTKYKKDGHDI PF	
ETFLGFKGDKVPDIDLNFSGEYQ PRAHNYTKVLFGEDNVYRAGTIGTVAD	1000
KTAYGFVKAYASDHNLELRGAEIDLAAGCTGVKRTTGQHPGGIIVVPDYM	
EIYDFTPIQYPADDTSSSEWRTHFDFHSIHDNLLKLDILGHDDPTVIRML	1100
QDLSGIDPKTIPTDDPDVMGIFSSTEPLGVTPEQIMCNVGTIGIPEFGTR	
FVRQMLEETRPKTFSELVQISGLSHGTDVWLGN AQELIQNGTCTLSEVIG	1200
CRDDIMVYLIYRGLEPSLAFKIMESVRKGKGLTPEFEAEMRKHDVPEWYI	
DSCKKIKYMFPAHAAAYVLM AVRIAYFKVHHPLLYYASYFTVRAEDFDL	1300
DAMIKGSPAIRKRIEEINAKGIQATAKEKSLLTVLEVALEM CERGFSEKN	
IDLYRSQATEFVIDGNSLIPPFNAIPGLGTNVAQAIVRAREEGEFLSKED	1400
LQORGKLSKTLLEYLESRGCLDSL PDHNQLSLF	

FIG. 89